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# AEROSPACE MEDICINE AND BIOLOGY

## A CONTINUING BIBLIOGRAPHY

### WITH INDEXES

### (Supplement 120)

### OCTOBER 1973

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# AEROSPACE MEDICINE AND BIOLOGY

## A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 120)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in September 1973 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*



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# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 354 reports, articles and other documents announced during September 1973 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1973 Supplements.

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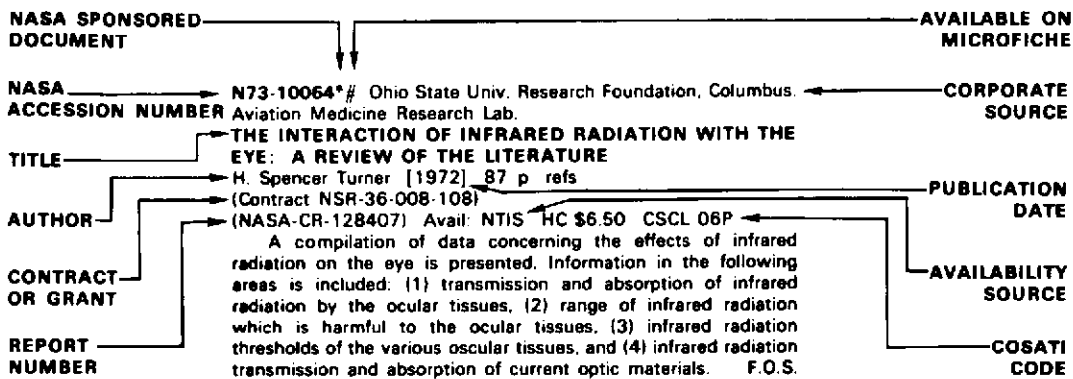
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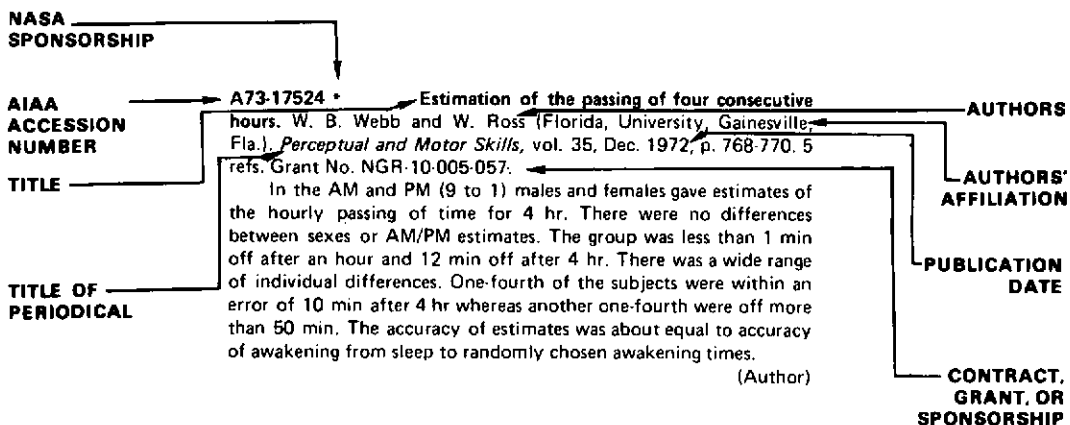
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## TYPICAL CITATION AND ABSTRACT FROM STAR



## TYPICAL CITATION AND ABSTRACT FROM IAA





# AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 120)

OCTOBER 1973

## IAA ENTRIES

**A73-34078 #** Man and machine - Systems for safety. E. Edwards (Loughborough University of Technology, Loughborough, Leics., England). In: Outlook on safety; Proceedings of the Thirteenth Annual Technical Symposium, London, England, November 14-16, 1972. Hayes, Middx., England, British Air Line Pilots Association, 1973, p. 21-36. 10 refs.

Systems are composed of three basic types of element: hardware (e.g., engines, airframes), software (e.g., organizational and operational procedures), and liveware (e.g., flight crew). These three component parts exist in an environment (physical, social, economic) which acts upon the elements in a variety of ways. In the development of a new system, these components are normally considered in the sequence environment-hardware-software-liveware. The competitive environment creates a need. Thereafter, the development of the system is dominated by the current state of the art in hardware. The design of the aircraft and its systems gives rise to a software requirement, in terms of routines to manage the various systems. These two components then dictate what is required from the crew, who must cope as best they can with the remaining parts of the system. Attention is given to the study of accidents, human factors in system design, and the implementation of human factors.

F.R.L.

**A73-34080 #** The effects of fatigue on health and flight safety. K. G. Bergin. In: Outlook on safety; Proceedings of the Thirteenth Annual Technical Symposium, London, England, November 14-16, 1972. Hayes, Middx., England, British Air Line Pilots Association, 1973, p. 62-74; Discussion, p. 75-87. 17 refs.

It is suggested that there is a very real relationship between fatigue, pilot error, and accident rates. Fatigue is identified by observation by others of errors in skills, increased irritability, lack of judgement, and mental aberration. It is caused by the period of responsibility, mental load, and physiological, physical, and psychological factors. It is recommended that everything must be done from the drawing board stage onward to see that the cockpit and environmental conditions of work of a pilot are the best that can be devised. There must be continuous study and monitoring of the conditions of flight, including every facet of operations such as timetables, slip patterns, aircraft characteristics, route patterns and densities, environmental conditions in the air, and all the other parameters of a pilot's duties.

F.R.L.

**A73-34097** Heart muscle viability following hypoxia - Protective effect of acidosis. O. H. L. Bing, W. W. Brooks, and J. V. Messer (Boston City Hospital, Boston, Mass.). *Science*, vol. 180, June 22, 1973, p. 1297, 1298. 7 refs. Research supported by the Medical Foundation, Massachusetts Heart Association, and Boston City Hospital; Grant No. NIH-HE-08613.

The mechanical performance of hypoxic heart muscle is further depressed by an acid pH. In contrast to preparations at normal or alkaline pH, however, hypoxic preparations at acid pH do not develop contracture and exhibit full recovery of mechanical activity upon reoxygenation.

(Author)

**A73-34120 #** Experimental-mathematical analysis of the effects of rotational accelerations on the vestibular apparatus (Eksperimental'no-matematicheskii analiz deistviia vrashchatel'nykh uskorenii na vestibuliarnyi apparat). E. V. Lapaev and N. B. Platonov. *Akademiia Nauk SSSR, Izvestiia, Seriya Biologicheskaiia*, May-June 1973, p. 357-363. 7 refs. In Russian.

It is mathematically demonstrated that in curvilinear motion the vestibular apparatus undergoes the action of a normal (centripetal) and rotational (tangential) acceleration. The reaction mechanisms thereby triggered are discussed. Obtained theoretical calculation results are shown to have been corroborated in 45 experiments upon rabbits. The results of these mathematical and experimental investigations suggest that, in the inhibition mechanism of the nystagmic reaction when the radius of curvilinear motion increases, the main factor is the decrease in the rotational moment magnitude and not the centrifugal force increase.

M.V.E.

**A73-34121 #** Effectiveness of some hemodynamic indices in the detection of vestibulo-vegetative disorders under ordinary conditions and those of hypoxia (K voprosu ob effektivnosti nekotorykh pokazatelei gemodinamiki v vyiaвлении vestibulo-vegetativnykh rasstroistv v obychnykh usloviakh i pri gipoksii). I. A. Sidel'nikov, S. S. Markarian, and G. I. Pavlov. *Akademiia Nauk SSSR, Izvestiia, Seriya Biologicheskaiia*, May-June 1973, p. 364-373. 35 refs. In Russian.

Study of the effects of motion sickness on the nature of changes in the hemodynamic indices displayed by examined subjects undergoing an undiscontinuous cumulation of Coriolis accelerations (UCCA) under ordinary (control) conditions and under hypoxia conditions. It is shown that the use in vestibulometric practice of hemodynamic indices obtained with the aid of the UCCA procedure is at present of limited value and should serve only as a complementary investigation technique in certain complex cases of vestibulo-vegetative disorders in aerospace medicine. The need for further refinement in hemodynamic index recording techniques is discussed.

M.V.E.

**A73-34122 #** Adequate vestibular stimulants on earth and in space (Adekvatnye vestibuliarnye razdrazhiteli na zemli i v kosmose). I. Iu. Sarkisov and A. A. Shipov (Moskovskii Fiziko-Tekhnicheskii Institut, Moscow, USSR). *Akademiia Nauk SSSR, Izvestiia, Seriya Biologicheskaiia*, May-June 1973, p. 374-379. 10 refs. In Russian.

Review of the results of a physico-mathematical analysis of vestibular reactions in human subjects during movements of the

head, truncus, and entire body, using static and mobile systems of reference in relation to the earth. Approximation formulas are presented for calculating the effective accelerations acting upon the receptors of the otolith organs and semicircular canals. An application of these formulas to the case of a man at work in an orbital station uniformly rotating for the purpose of artificial gravity generation is demonstrated with the aid of a three-element human skeleton model. M.V.E.

**A73-34123 # Physiological criteria of early toxic normobaric hyperoxia manifestations (Fiziologicheskie kriterii rannikh toksicheskikh proiavlenii normobaricheskoi giperoksii).** A. M. Genin, M. A. Tikhonov, V. B. Malkin, V. A. Glazkova, E. P. Grishin, N. T. Drozdova, E. V. Loginova, L. A. Lushina, N. A. Roshchina, and V. I. Solov'ev. *Akademiia Nauk SSSR, Izvestiia, Seriya Biologicheskaiia*, May-June 1973, p. 380-391. 21 refs. In Russian.

The effects of normobaric hyperoxia over a duration range from 4 to 24 hr upon the physiological functions of the human organism were investigated in 79 experiments with 49 healthy males ranging in age from 18 to 23, in order to determine the safe time limits of pure oxygen respiration. The time-dependent development dynamics of the toxic effect syndromes of hyperoxia are described in terms of work capacity changes, systemic and regional hemodynamic indices, structural indices of hemopoiesis, acid-alkali equilibrium, and fermental and phagocytic blood activity. The mechanisms possibly responsible for the changes observed are discussed. M.V.E.

**A73-34149 \* Motivation in vigilance - A test of the goal-setting hypothesis of the effectiveness of knowledge of results.** J. S. Warm, S. W. Riechmann, A. F. Grasha, and B. Seibel (Cincinnati, University, Cincinnati, Ohio). *Psychonomic Society, Bulletin*, vol. 1, no. 5A, May 1973, p. 291, 292. 9 refs. Grant No. NGL-36-004-014.

This study tested the prediction, derived from the goal-setting hypothesis, that the facilitating effects of knowledge of results (KR) in a simple vigilance task should be related directly to the level of the performance standard used to regulate KR. Two groups of Ss received dichotomous KR in terms of whether Ss response times (RTs) to signal detections exceeded a high or low standard of performance. The aperiodic offset of a visual signal was the critical event for detection. The vigil was divided into a training phase followed by testing, during which KR was withdrawn. Knowledge of results enhanced performance in both phases. However, the two standards used to regulate feedback contributed little to these effects. (Author)

**A73-34150 Information processing in the visual periphery.** J. R. Antes and D. C. Edwards (Iowa State University of Science and Technology, Ames, Iowa). *Psychonomic Society, Bulletin*, vol. 1, no. 5B, May 1973, p. 351-353. 11 refs.

The information processing capacity of the visual periphery was investigated in two experiments using stimuli of known relative information content. The results of Experiment I showed redundant patterns to be easiest to identify at all peripheral angles tested (5, 10, 20, and 30 deg) as compared to intermediate and nonredundant patterns. Performance on all patterns decreased as peripheral angle increased. In Experiment II, simultaneous foveal and peripheral vision was required in a discrimination task. Performance was above chance only when the peripheral (7-deg) pattern was redundant. The foveal pattern had no effect on discrimination. (Author)

**A73-34223 Space-time adaptation of visual position constancy.** J. C. Hay (Wisconsin, University, Milwaukee, Wis.) and W. M. Goldsmith (California State College, Stanislaus, Calif.). *Journal of Experimental Psychology*, vol. 99, June 1973, p. 1-9. 17 refs. Research supported by the University of Wisconsin; NSF Grant No. GB-33449.

Rearrangements of time as well as space produce perceptual adaptation in the case of optical feedback to head movement. The adaptation may be summarized as follows: (1) in the rearrangement condition, a luminous spot is made to move right (left) whenever the observer's head moves up (down), and this artificial horizontal spot motion may be synchronous with the vertical head movement, or subject to a fixed time lag of as much as 225 msec; and (2) after a few minutes' exposure to the rearrangement condition, an objectively stationary spot appears to move left (right) whenever the observer's head moves up (down), and this illusory horizontal spot motion has a time lag similar to that of the arrangement condition. The findings are consistent with a modified form of Held's correlation-storage theory of perceptual adaptation, in which the correlation storage is capable of compensating for differing latencies of motor and sensory signals. (Author)

**A73-34226 # Morphological changes in kidneys during exposure to variously oriented accelerations at a level of 4 g for many hours (Morfologicheskie izmeneniia pochek pri mnogochasovom deistvii raznonapravlennykh uskorenii velichinai 4 g).** A. S. Pankova and E. A. Savina. *Kosmicheskaiia Biologiia i Meditsina*, vol. 7, May-June 1973, p. 8-13. 14 refs. In Russian.

Morphological changes in kidneys as a function of the duration and orientation of acceleration were studied in 76 rats exposed to 4-g acceleration for periods of 3, 8, 16, and 24 hours. Results described include dystrophic changes in the epithelium of distal and proximal canaliculi, morphological evidence of blood shunting, antidiuresis, and spasm of the arteries and supply arterioles of the cortical glomeruli. The observations seem to indicate compensatory and adaptive reactions aimed at stabilization of the hemodynamics and water balance under exposure to acceleration. T.M.

**A73-34227 # Reaction of the central nervous system to mechanical effects (Reaktsiia tsentral'noi nervnoi sistemy na mekhanicheskie vozdeistviia).** I. D. Kudrin, G. A. Akimov, F. V. Sudzilovskii, B. S. Glushkov, Iu. M. Zagorskii, S. D. Kumanichkin, and Z. K. Sulimo-Samuillo. *Kosmicheskaiia Biologiia i Meditsina*, vol. 7, May-June 1973, p. 13-17. In Russian.

Experiments on rabbits show that impact accelerations evoke microscopic shifts (often reversible) in the state of nerve tissue elements (chromatolysis and hydropic transformations of nerve cells) and dystonic changes in cerebral vessels (diapedetic extravasation, subpial hemorrhages, and ectasia). Sensitivity to transverse impact accelerations declines in the following order: sensitive ganglia of the spinal cord, subcortical formations, cortical cells. It is concluded that the mechanical immunity of the overall central nervous system is governed both by the state of the nerve elements and by the resistance of cerebral vessels. T.M.

**A73-34228 # Influence of hypoxia on the release of certain gaseous wastes in white rats (Vlianie gipoksii na vydelenie nekotorykh gazoobraznykh produktov zhiznedeiatel'nosti u belykh krysi).** T. S. Kolosova and L. A. Tiunov. *Kosmicheskaiia Biologiia i Meditsina*, vol. 7, May-June 1973, p. 17-21. 15 refs. In Russian.

Experiments were conducted with white rats in a special chamber in order to study the effects of hypoxia on the release of such gaseous wastes as carbon monoxide, ammonia, acetone, carboxylic acids, and indole. It is shown that a four-day exposure to hypoxia (7.7 plus or minus 2.1% oxygen) at normal barometric pressure reduces the release of ammonia and increases the release of carbon monoxide, acetone, and carboxylic acids. During a 24-day exposure to hypoxia (11 to 14% oxygen), the yield of gaseous wastes continued to rise for a period of 10 to 11 days and then stabilized. Possible mechanisms responsible for changes in the yield of gaseous wastes during hypoxia are discussed. T.M.

**A73-34229 # Temperature conditions and blood supply of the brain in animals (Temperaturnye rezhimy i krovosnabzhenie golovnogo mozga zhivotnykh).** O. E. Ozerova. *Kosmicheskaiia Biologiia i Meditsina*, vol. 7, May-June 1973, p. 21-25. 11 refs. In Russian.

**A73-34230 #** Morphological and electron-microscopic alterations of the myocardium in dogs subjected to lasting chronic gamma irradiation (Morfologicheskie i elektronno-mikroskopicheskie izmeneniia serdechnoi myshtsy u sobak, podvergnutykh dlitel'nomu khronicheskomu gamma-obluchenniu). L. A. Bepalova. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 26-30. 11 refs. In Russian.

**A73-34231 #** Development of effective means for desaturation of the human organism as a prophylactic measure against altitude decompression disturbances (Izyskanie effektivnykh rezhimov desaturatsii organizma cheloveka dlia profilaktiki vysotnykh dekompressionnykh rasstroistv). A. M. Genin, I. N. Cherniakov, I. V. Maksimov, and V. A. Glazkova. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 34-39. 8 refs. In Russian.

Several denitrogenation procedures were examined relative to their effectiveness in preventing decompression disturbances which may occur under conditions of intense physical work in a pressurized suit at very low ambient atmospheric pressure. Eighty experiments with 23 human subjects show that the breathing of a 100% oxygen atmosphere for five hours or the breathing of an oxygen-nitrogen mixture with 40 to 45% oxygen for 10 hours at a pressure of 430 mm Hg can effectively prevent decompression sickness in men performing hard work at a pressure of 200 mm Hg. For work at 300 mm Hg barometric pressure, the decompression disturbances can be prevented by a prior breathing of oxygen at 430 mm Hg for two hours. T.M.

**A73-34232 #** Effect of stepwise adaptation to high-mountain areas on the respiratory function and the acid-alkali equilibrium of blood in subjects with different motor activity stresses (Vliianie stupenchatoi adaptatsii k vysokogor'iu na dykhatel'nyu funktsiiu i kislotno-shchelochnoe ravновесие krovi pri razlichnykh rezhimakh dvigatel'noi aktivnosti ispytuemykh). V. I. Korol'kov, I. Ia. Lunev, O. N. Narbekov, and V. G. Vasil'ev. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 40-43. 7 refs. In Russian.

**A73-34233 #** Effects of the hypodynamics and other factors of a spaceflight on the excretion of 17-oxy corticosteroids and aldosterone (Vliianie gipodinamiki i drugikh faktorov kosmicheskogo poleta na ekskretsiyu 17-oksikortikosteroidov i al'dosterona). I. G. Dlusskaia, L. A. Vinogradova, V. B. Noskov, and I. S. Balakhovskii. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 43-48. 14 refs. In Russian.

**A73-34234 #** Influence of lower-body decompression on the state of the human cardiovascular system /according to roentgenokymographic data/ (Vliianie dekompressii nizhnei poloviny tela na sostoianie serdechno-sosudistoi sistemy cheloveka /po dannym Rentgenokymografii/). V. G. Voloshin, I. G. Krasnykh, and L. A. Tiutin. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 48-50. 16 refs. In Russian.

Roentgenokymography was used to study the effects of lower-body negative pressure on the human cardiovascular system in 22 experiments with 16 healthy subjects. Roentgenokymograms were recorded prior to the decompression and from 10 to 16 min after the application of -40 and -80 mm Hg lower-body negative pressure. It is demonstrated that lower-body negative pressure produces sharp changes of hemodynamics in the human organism, involving (1) reduced size and value of the diastolic, systolic, stroke, and minute volumes of the heart, (2) a weakening of the contractile function of the myocardium, and (3) an increase in the angle of inclination of the heart axis. T.M.

**A73-34235 #** Analysis of vestibular effects in experiments on swings (Analiz vestibuliarnykh vozdeistvii v eksperimentakh na kacheliakh). I. Ia. Sarkisov and A. A. Shipov. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 51-57. 27 refs. In Russian.

Results of a physico-mathematical analysis of the vestibular effects sustained by a human subject on four types of experimental swings ensuring (1) reversible translational motion in the vertical plane, (2) linear one-dimensional reversible translational motion in the horizontal plane, (3) linear reversible translational motions simultaneously in vertical and horizontal directions, and (4) curvilinear motion along an arc. Formulas are derived for calculating the effective accelerations acting on the receptors of any particular system of the vestibular apparatus, and attention is given to possible modifications of swing equipment used for professional evaluation of vestibular stability. T.M.

**A73-34236 #** Certain features of hemodynamics during orthostatic tests with persons of different vestibulo-vegetative tolerance levels (Nekotorye osobennosti gemodinamiki pri ortostaticheskoi probe u lits s razlichnoi vestibulo-vegetativnoi ustoi-chivost'iu). V. V. Usachev, G. P. Mikhailovskii, N. V. Tatarinova, and I. P. Shinkarevskaya. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 57-62. 19 refs. In Russian.

Comparison of certain hemodynamic indices in humans during orthostatic tests (a 30-min passive orthostatic test on a turntable tilted at 90 deg) and in the presence of vestibular stimuli (repeated exposure to complex low-level accelerations). It is demonstrated that subjects with a high level of tolerance to vestibular stimuli exhibit minimal functional shifts in systemic hemodynamics during tests on the tilted turntable. Subjects with low tolerance to low-level accelerations exhibited substantial changes in arterial pressure, volumetric blood flow rate, and the vascular tone. Possible mechanisms underlying the observed correlations are discussed. T.M.

**A73-34237 #** Informative parameters of the psychophysiological state of flight personnel when working with indicators (Ob informativnykh parametrokh psikhofiziologicheskogo sostoiianiia letnogo sostava pri rabote s indikatorom). K. K. Ioseliani, L. D. Chainova, and E. M. Beletskii. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 62-68. 14 refs. In Russian.

An experimental study was conducted to determine stable informative indices of the psychophysiological status of flight crews for use in evaluating the degree of sensory comfort experienced in visual perception tasks with CRT cartographic displays of varying complexity. Maps with 18 levels of saturation by such cartographic elements as roads, rivers, and population centers were displayed for limited periods (20 sec), and subjects were required to acknowledge the identification of a possibly present feature by a speech or motor reaction. The speed and accuracy of target feature recognition were measured along with various physiological parameters (electroencephalogram, electrooculogram, electrotonogram, skin galvanic reflex, voice response, and others). The parameters most suitable for evaluation of subject's condition in such tasks are identified. T.M.

**A73-34238 #** Investigation of the possibility of human adaptation to a 16-hour day (Izuchenie vozmozhnosti adaptatsii cheloveka k sutkam 16-chasovoi prodolzhitel'nosti). S. I. Stepanova. *Kosmicheskaya Biologiya i Meditsina*, vol. 7, May-June 1973, p. 68-75. 5 refs. In Russian.

The possibility of adaptation to a 16-hr diurnal cycle consisting of 11 hours of wakefulness and 5 hours of sleep was studied with two men and five women in an experiment lasting for 16 astronomical days. The results show that the subjects' body temperature did not change under the influence of the new diurnal cycle and retained its original dependence on the actual time of day. Premature retirement to sleep did not disturb the usual behavior of the temperature curve, and the resulting sleep was both short and light. Postponed sleep was both deeper and more peaceful and was accompanied by a change of the natural dynamics of the body temperature. T.M.

**A73-34239 #** Study of intestinal *Lactobacillus* species composition during a long stay of humans in a closed space (Issledovanie vidovogo sostava laktobatsill kishechnika v usloviakh dlitel'nogo prebyvaniia cheloveka v zamknutom prostranstve). A. A. Lentsner, V. M. Shilov, N. N. Liz'ko, and M. E. Mikel'saar. *Kosmicheskaiia Biologiia i Meditsina*, vol. 7, May-June 1973, p. 78-80. 29 refs. In Russian.

**A73-34240 #** Investigation of the disinfecting properties of sorbents which are used in a spacecraft life support system (Issledovanie obezrazhivaiushchikh svoystv sorbentov, ispol'zuemykh v sisteme zhizneobespecheniia kosmicheskikh korablei). S. V. Chizhov, E. S. Tepper, G. F. Korshunova, N. B. Kolesina, M. I. Shikina, and V. V. Krasnoshekov. *Kosmicheskaiia Biologiia i Meditsina*, vol. 7, May-June 1973, p. 80-83. 8 refs. In Russian.

**A73-34241 #** Choice of optimal light characteristics for marks in optical sighting devices (Vybór optimal'nykh svetovykh kharakteristik mark opticheskikh vizirnykh ustroistv). S. M. Zalkind. *Kosmicheskaiia Biologiia i Meditsina*, vol. 7, May-June 1973, p. 83-87. In Russian.

Numerous optical sighting devices used for observation of distant objects employ a separate optical channel that projects optical markings facilitating orientation of features in the observed field. The present study describes experiments conducted for the purpose of identifying brightness levels and colors of superimposed ring marks, required to ensure proper contrast for resolution on various image backgrounds. The test equipment afforded variation of the levels of both image and mark illumination, and replaceable filters were used to study the effects of color. Emphasis is placed on the observed inductive effect of the orientation marks, involving a drop in image visibility in the immediate vicinity of the mark. T.M.

**A73-34399 \*** Effect of iron and salt on prodigiosin synthesis in *Serratia marcescens*. M. P. Silverman and E. F. Munoz (NASA, Ames Research Center, Planetary Biology Div., Moffett Field, Calif.). *Journal of Bacteriology*, vol. 114, June 1973, p. 999-1006. 17 refs.

Iron requirements of *Serratia marcescens* for growth and prodigiosin synthesis are investigated. Sodium chloride of sea salt is shown to be responsible for inhibition of prodigiosin synthesis in the microorganism. The role of sodium chloride in the terminal biosynthetic pathway of the pigment is discussed. V.Z.

**A73-34452** Vectorcardiography. A. Benchimol (Good Samaritan Hospital, Phoenix, Ariz.). Baltimore, Md., Williams and Wilkins Co., 1973. 232 p. 269 refs. \$18.50.

Lead systems are considered together with atrial and ventricular activation, atrial hypertrophy, left ventricular hypertrophy, and right ventricular hypertrophy. Conduction defects are investigated, giving attention to the right bundle branch block, the incomplete right bundle branch block, the left bundle branch block, the incomplete left bundle branch block, left anterior and left posterior hemiblocks, and bifascicular and trifascicular blocks. Other subjects discussed include myocardial infarction, myocardial injury and ischemia, timed vectorcardiography and His bundle electrograms, preexcitation, the Wolff-Parkinson-White syndrome, and some specific disease states.

G.R.

**A73-34533** Digital computer diagnosis of cardiac arrhythmias in a single-lead electrocardiogram. S. T. Rabin, O. M. Haring, F. J. Lewis, M. Quinn, and D. Van Kirk (Northwestern University, Chicago, Ill.). *International Journal of Engineering Science*, vol. 11, June 1973, p. 701-716. 13 refs. Grant No. NIH-2-R01-HE-10177-04.

**A73-34572 \*** Thermal synthesis of amino acids from a simulated primitive atmosphere. J. G. Lawless and C. D. Boynton (NASA, Ames Research Center, Moffett Field, Calif.). *Nature*, vol. 243, June 15, 1973, p. 405-407. 16 refs.

The recently developed techniques of gas chromatography and gas chromatography combined with mass spectrometry were applied for identification of the compounds produced by thermal synthesis. The synthesis was carried out by passing methane, which was bubbled through water at 80 C, and ammonia through a 'Vycor' tube containing quartz sand. Reactions were performed with the tube at various temperatures between 900 C and 1,060 C while controls were held at ambient temperature. G.R.

**A73-34599 \*** Structure of the lipid phase in cell envelope vesicles from *Halobacterium cutirubrum*. A. F. Esser and J. K. Lanyi (NASA, Ames Research Center, Biological Adaptation Branch, Moffett Field, Calif.). *Biochemistry*, vol. 12, 1973, p. 1933-1939. 41 refs.

**A73-34617** European approach to dummy design. P. Warner (Ogle Research, Ltd., Letchworth, Herts., England). In: International Aerospace Instrumentation Symposium, 19th, Las Vegas, Nev., May 21-23, 1973, Proceedings. Pittsburgh, Pa., Instrument Society of America, 1973, p. 193-198.

Until comparatively recent years dummies had been made to conform to sizes and weights only specifications. Little attention has been paid to the response of heads, necks, chests, spine and the pelvic area, to externally applied dynamic loads. However, over the last few years with the interests of the U.S. and other Governments in automobile safety, and military interest in the effects of high 'G' loadings encountered in ejection seat testing, etc, much research has been carried out into the dynamic response on cadavers and living subjects. The endeavour of Ogle as Europe's only manufacturer of fully articulated anthropometric dummies was to aim to convert this research work into hardware. (Author)

**A73-34639 #** Dependence of visual acuity on background brightness (Zavisimost' ostroty zreniia ot iarkosti fona). A. V. Luizov and N. S. Fedorova. *Akademiia Nauk SSSR, Doklady*, vol. 210, May 1, 1973, p. 247, 248. In Russian.

A formula is proposed for visual acuity as a function of background brightness. Experimental data are given to demonstrate the suitability of this formula in practical applications. The validity of some other existing formulas is subjected to critical analysis. V.Z.

**A73-34655** Evaluation of crashworthiness test data. R. F. Chandler (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Society of Automotive Engineers, Business Aircraft Meeting, Wichita, Kan., Apr. 3-6, 1973, Paper 730290*. 29 p. 37 refs. Members, \$1.25; nonmembers, \$2.00.

Review of current approaches to evaluating dynamic test results in terms of likelihood of injury to the human occupant. The limitations and background of those approaches are discussed, and technical considerations for the selection and use of anthropomorphic dummies are presented. (Author)

**A73-34656** Current developments in restraint systems. L. E. Morgan (Pacific Scientific Co., City of Commerce, Calif.). *Society of Automotive Engineers, Business Aircraft Meeting, Wichita, Kan., Apr. 3-6, 1973, Paper 730291*. 4 p. Members, \$1.25; nonmembers, \$2.00.

Restraint systems for various types of aircraft are shown, giving attention to military aircraft, transport aircraft, and general aviation. A pilot's seat representing the latest developments in crew restraint systems has a dual shoulder harness with a inertial reel on each strap, lap belt retractors on both sides, and a crotch strap with retractors. Shoulder straps are used to prevent the compression load which would be imposed on the spine when the pilot is forced forward, as in a crash. G.R.

**A73-34687** General aviation pilot operations. G. S. Weislogel (Ohio State University, Columbus, Ohio). *Society of Automotive Engineers, Business Aircraft Meeting, Wichita, Kan., Apr. 3-6, 1973, Paper 730334*. 8 p. 17 refs. Members, \$1.25; nonmembers, \$2.00.

Until recently little has been known about the operational profiles of the different categories of general aviation pilots, resulting in judgments about their operations which are a priori at best. Studies have been conducted which yield for the first time quantitative measures useful in describing the nature of certain categories of general aviation pilots and their flight operations. Study findings are expected to have implications for airman certification standards, flight safety regulations, and aircraft design. Rather than a report of a specific research study, this paper can be considered a ready reference in that it presents a broad review and summary of several studies which have developed information about general aviation pilot operations. (Author)

**A73-34741 \*** Experiment M-131 - Human vestibular function. E. F. Miller, II and A. Graybiel (U.S. Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aerospace Medicine*, vol. 44, June 1973, p. 593-608. 53 refs. NASA-supported research. NASA Order T-87973; NASA Order T-81633.

The purpose of the M-131 experiment is to measure responses in astronauts throughout orbital flight that reflect vestibular function and compare them with measurements made before and after flight. Three subtasks require measurement of (1) susceptibility to motion sickness, (2) thresholds of response to stimulation of the semicircular canals, and (3) space perception, viz, visual and nonvisual localization, using external spacecraft and internal morphological frames of reference. Four astronauts will be available for all measurements in Skylab 2 and 3 and two additional astronauts for only the 'static' measurements during the flights. (Author)

**A73-34742** Heat acclimatization while wearing vapor-barrier clothing. E. Shvartz, E. Saar, N. Meyerstein, and D. Benor (Negev Institute of Arid Zone Research, Beersheba; Tel Aviv University, Tel Hashomer, Israel). *Aerospace Medicine*, vol. 44, June 1973, p. 609-612. 21 refs.

Acclimatization to a hot, humid environment was studied in nine men who performed moderate work at an air temperature of 37 C while wearing vapor-barrier suits, for 6 successive days. Heart rate, rectal and skin temperatures, sweat rate, and oxygen consumption were recorded. The results showed only partial acclimatization, which was indicated by decreases in heart rate and in rectal and skin temperatures of 16 beats/min, 0.5 C and 0.6 C respectively from the first to the sixth exposures. Sweat rate increased 25%, oxygen consumption decreased 13%, and resting rectal temperature decreased by 0.3 C. These changes made possible an increase of 13 min in tolerance time. (Author)

**A73-34743 \*** Effects of oxygen-augmented atmosphere on the immune response. H. N. Guttman (Illinois, University, Chicago, Ill.). *Aerospace Medicine*, vol. 44, June 1973, p. 624-627. 21 refs. Research supported by the John A. Hartford Foundation and NASA.

Antibovine serum albumin antibody and nonspecific protein production was evaluated in female rabbits (11-14.5 kg) housed in special cages ventilated with 20% or 40% oxygen at normal barometric pressure. Animals exposed to 40% oxygen do not show normal steady increase of serum antibody. Instead, their titers show a pattern of undershoot, overshoot, undershoot, and finally equilibration at a subnormal level; they have a depressed popliteal node polysome level and have an abnormally low proportion of membrane-bound polysomes. They also show reduced capability of popliteal nodes to synthesize protein (as expected from the reduced number of polysomes). However, the ratio of newly-synthesized specific antibody: nonspecific protein remains normal. (Author)

**A73-34744** Cobalt compounds for the control of hypoxic stress. H. D. Brahmachari and S. Joseph (Defence Institute of Physiology and Allied Sciences, Delhi, India). *Aerospace Medicine*, vol. 44, June 1973, p. 636-638. 5 refs.

Cobalt chloride, cobaltodihistidine, and Roncovite tablets were administered orally, on a daily dose equivalent to 2 mg cobalt per rat, and the polycythemic response of the treated animals to hypoxic exposure equivalent to an altitude of 27,500 ft for 40 days was compared with normal controls. The amounts of cobalt retained by the body tissues of the treated animals were also determined. The comparative efficiency of Roncovite tablets and cobaltodihistidine in relieving the hypoxic stress, as evidenced by their lowering of the degree of polycythemic response was determined. (Author)

**A73-34745** Sleep patterns in a lone global pilot. F. S. Preston and D. J. Cussen (Institute of Sports Medicine, London, England). *Aerospace Medicine*, vol. 44, June 1973, p. 669-674. 14 refs.

A considerable amount of work has been carried out on the sleep disruption engendered on flying across time zones in airline pilots. This paper is concerned with the sleep patterns of a lone woman record-breaking pilot involved in a global flight and discusses the problems facing those engaged in such flights and in the planning of them. No measurements were made on psychomotor performance by the authors as this was carried out by other agencies and the results of these studies are yet to be published. (Author)

**A73-34746** Aircraft as an instrument of self-destruction. R. E. Yanowitch, J. M. Bergin, and E. A. Yanowitch (FAA, Office of Aviation Medicine, Washington, D.C.). *Aerospace Medicine*, vol. 44, June 1973, p. 675-678.

Often the relationship between the pilot and his aircraft is such that the aircraft may be thought of as an extension of the pilot himself during the act of flight. If this pilot accumulates stress in his life with which he can no longer adequately cope, he may engage in self-destructive acts, some of these within the context of his flying activities. Concepts and constructs of self-destructive behavior, stress, coping mechanisms, competence and the myth of invulnerability are defined, illustrated and related to the pilot population. (Author)

**A73-34747** In-flight loss of consciousness. R. B. Rayman (USAF, Inspection and Safety Center, Norton, AFB, Calif.). *Aerospace Medicine*, vol. 44, June 1973, p. 679-681.

United States Air Force (USAF) experience of in-flight loss of consciousness during the period Jan. 1, 1966 through June 30, 1971 has been reviewed. Thirty-two such cases have been identified among aircrewmembers. Loss of consciousness in flight can occur in any aircrewman regardless of age, type of aircraft, or flying experience. The etiologies included are rapid decompression, hypoxia, dysbarism, seizure disorder, improper M-1 maneuver, vasovagal syncope, coronary insufficiency, overpressurization of cockpit, functional hypoglycemia, migraine headache, schizophrenia, and negative Gz. Seven cases resulted in a fatal crash; 23 others would probably have been fatalities had not a copilot recovered the aircraft. (Author)

**A73-34748** Aircraft accidents and human factors. F. O. Hemming (Canadian Pacific Air Lines, Richmond, British Columbia, Canada). *Aerospace Medicine*, vol. 44, June 1973, p. 682-684. 7 refs.

The days of pilot error and cause undetermined findings in aircraft accidents are past. In-depth consideration of human factors, both intrinsic and extrinsic, and the addition of flight recorder and cockpit voice recorder data now allow more definitive evaluation of all the human factors involved in each accident. Public acceptance of human frailty has not reached the stage where all facts are palatable and, in this regard, the press has a part to play by withholding editorial comment until all the facts are established. (Author)

**A73-34839** Evidence for non-linear response processes in the human visual system from measurements on the thresholds of spatial beat frequencies. G. J. Burton (Imperial College of Science and Technology, London, England). *Vision Research*, vol. 13, July 1973, p. 1211-1225. 25 refs. Research supported by the Science Research Council.

**A73-34840** The visual cortex as a spatial frequency analyser. L. Maffei and A. Fiorentini (CNR, Laboratorio di Neurofisiologia, Pisa, Italy). *Vision Research*, vol. 13, July 1973, p. 1255-1267. 17 refs.

Analysis of individual neuron responses to stimuli of different frequencies, phases and contrasts in various segments of the visual pathway of cats. Spatial attention is given to neuron responses to sinusoidal signals of various spatial frequencies in the retina, the lateral geniculate and the striate cortex. A linear relation is established between the response amplitudes and the logarithm of signal grating contrast in simple cortical cells and in some complex cortical cells. V.Z.

**A73-34841** Stereoscopic depth aftereffects with random-dot patterns. N. Long and R. Over (Queensland, University, St. Lucia, Australia). *Vision Research*, vol. 13, July 1973, p. 1283-1287. 8 refs.

Random-dot stereograms were used for aftereffect measurement in binocular depth perception tests on subjects who were to estimate the distance to a binocularly visible object after exposure to a stereostimulus whose horizontal disparity was varied systematically. The results are believed to indicate that the visual system of man contains neural channels which respond selectively to binocular disparity. V.Z.

**A73-34842** Extended border enhancement during intermittent illumination - Binocular effects. A. Remole (Waterloo, University, Waterloo, Ontario, Canada). *Vision Research*, vol. 13, July 1973, p. 1289-1295. 11 refs.

Monocular and binocular vision tests were conducted in the estimation of boundary brightness expansion which takes place at the illuminated field edge during intermittent illumination below the fusion frequency. Monocular and binocular perceptions of this effect by subjects differed only slightly when the illumination levels of the retina were equal in both series of tests. V.Z.

**A73-34843** Temporal factors of movements in visual aftereffects (Facteurs temporels dans le mouvement consécutif visuel). C. Bonnet (CNRS, Laboratoire de Psychologie Expérimentale et Comparée, Paris, France). *Vision Research*, vol. 13, July 1973, p. 1311-1317. 16 refs. In French.

Visual aftereffects involving motor reflexes of the eye are interpreted in terms of sensor system reactions. Visual test sequences with alternating more rigorous and less rigorous time-space exposure conditions are conducted. Such conditions and variations in adaptation time before tests are discussed as time factors influencing these visual aftereffects. V.Z.

**A73-34844** Opponent-colors responses in the visually evoked potential in man. T. Yamanaka, H. Sobagaki, and Y. Nayatani (Electrotechnical Laboratory, Amagasaki, Hyogo, Japan). *Vision Research*, vol. 13, July 1973, p. 1319-1333. 14 refs.

Analysis of evoked cortical potentials in three subjects with normal color vision who received spectral stimuli from 400 to 700 nm under constant retina illuminance of 300 trolands. Opponent-colors responses in two subjects were similar to those indicated by Jameson and Hurvich (1955) while the responses of the third subject showed no appreciable dependence on the spectral composition of stimuli. V.Z.

**A73-34845** Movement perception during voluntary saccadic eye movements. G. Orban, J. Duysens, and M. Callens (Leuven, Katholieke Universiteit, Louvain, Belgium). *Vision Research*, vol. 13, July 1973, p. 1343-1353. 9 refs.

**A73-34846** Stabilized target visibility as a function of contrast and flicker frequency. U. Tulunay-Keesey (Wisconsin, University, Madison, Wis.). *Vision Research*, vol. 13, July 1973, p. 1367-1373. 10 refs. Grant No. NIH-EY-00308.

**A73-34847** The effect of colour on time delays in the human oculomotor system. A. W. Goodwin (Australian National University, Canberra, Australia). *Vision Research*, vol. 13, July 1973, p. 1395-1398. 12 refs.

A contact lens technique was applied to measure eye movements in a study of the effect of target color on time delay in random tracking motion and on saccadic reaction times in two subjects with normal visual acuity, light sense and color vision. The results suggest that target color is not an important factor of time delay in both tracking motion and saccadic reactions. V.Z.

**A73-34893** Refinement of X ray data on proteins. II - Adjustment of structure of specified geometry to relieve atomic overlaps. P. K. Warne and H. A. Scheraga (Cornell University, Ithaca, N.Y.). *Journal of Computational Physics*, vol. 12, May 1973, p. 49-64. 13 refs. NSF Grant No. GB-28469X1; Grant No. PHS-GM-14312.

In a first stage of refinement of the X ray data on proteins, the dihedral angles of the backbone and side chains were adjusted by a least-squares fit to the X ray coordinates so that the computed structure conformed to the bond angles and bond lengths derived from crystal structures of its constituent amino acids. The results are used here as the starting point for the second stage of the refinement, in which atomic overlaps that persist through the first stage are relieved. The energy of the first-stage structure is reduced considerably in the second stage, and the root-mean-square deviation of the computed coordinates from the X ray ones is reduced in going from the first to the second stage of refinement. The second-stage refinement procedure is applied here to lysozyme, and the resulting structure may then be used as a starting point for conformational energy calculations in which the total energy is minimized. (Author)

**A73-34963** # An attempt to obtain an electroretinographic perimeter (Tentativo per una perimetria elettroretinografica). B. Bagolini (Trieste, Università, Trieste, Italy), V. Barbaro, C. Bosi, A. Daniele, and M. Neroni (Istituto Superiore di Sanità, Italy). In: Electronics in the automation of services; International Congress on Electronics, 20th, Rome, Italy, March 28-31, 1973, Proceedings. Rome, Rassegna Internazionale Elettronica e Nucleare, 1973, p. 257, 259-263. 5 refs. In Italian.

Description of a new technique for obtaining a localized electroretinogram by employing Ulbricht's principle of a uniformly illuminated sphere. The proposed technique is capable of maintaining the amount of scattered light constant but stimulates retinal zones with angular dimensions no greater than 3 deg, thus making it possible to obtain an electroretinographic perimeter. A.B.K.

**A73-34964** # Automatic recognition of electrocardiographic patterns (Riconoscimento automatico di configurazioni elettrocardiografiche). G. Clemente, D. Fantuzzo (Padova, Università, Padova, Italy), and R. Degani (CNR, Laboratorio per l'Elettronica Biomedica, Padova, Italy). In: Electronics in the automation of services; International Congress on Electronics, 20th, Rome, Italy, March 28-31, 1973, Proceedings. Rome, Rassegna Internazionale Elettronica e Nucleare, 1973, p. 365, 367-374. In Italian.

Development of a procedure which leads to beat cycle identification and to a synthetic waveform description suitable for an effective ECG classification. A sequential procedure is described



which starts with a preliminary segmentation of the ECG into intervals obtained by derivative morphological filters and leads to a triangular approximation of ECG complexes. A.B.K.

**A73-34965 # Automatic cataloging of electrocardiographic patterns** (Catalogazione automatica di configurazioni elettrocardiografiche). G. Clemente, D. Fantuzzo (Padova, Università, Padova, Italy), and R. Degani (CNR, Laboratorio per l'Elettronica Biomedica, Padova, Italy). In: Electronics in the automation of services; International Congress on Electronics, 20th, Rome, Italy, March 28-31, 1973, Proceedings. Rome, Rassegna Internazionale Elettronica e Nucleare, 1973, p. 375, 377-386. 5 refs. In Italian.

Description of the coding and sorting techniques used on ECG patterns in a project for achieving fully computerized ECG diagnosis. Two different codes are used for ECG recognition - namely, a variable-length morphological pattern code which qualitatively describes the evolution of the ECG in a cardiac cycle, and a cycle descriptive code which associates an appropriate hexadecimal waveform descriptive code with each of the possible patterns. A.B.K.

**A73-34966 # Automatic analysis and classification of electroencephalograms** (Analisi e classificazione automatica degli elettroencefalogrammi). F. F. Milone (Vicenza, Ospedale Civile, Vicenza, Italy), G. U. Righini, and A. Cumani (Istituto Elettrotecnico Nazionale G. Ferraris, Torino, Italy). In: Electronics in the automation of services; International Congress on Electronics, 20th, Rome, Italy, March 28-31, 1973, Proceedings. Rome, Rassegna Internazionale Elettronica e Nucleare, 1973, p. 397, 399-406. In Italian.

Description of a mathematical procedure for processing EEG data in such a way as to allow automatic classification of EEG traces. In the proposed procedure the EEG is treated as a time series for the analysis of which ordinary statistical methods are employed - namely, spectral analysis for describing the steady component of the EEG signal, and prediction for plotting the transient component. The proposed procedure is based on correlogram estimations, for which purpose the 'triggered correlation' algorithm is employed. A.B.K.

**A73-35061 Precision survivor locator for search and rescue applications.** E. A. Harvey (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio) and D. L. Jensen (USAF, Operational Test and Evaluation Div., Hill AFB, Utah). *American Helicopter Society, Annual National Forum, 29th, Washington, D.C., May 9-11, 1973, Preprint 720*. 6 p. Members, \$1.50; nonmembers, \$2.00.

With the advent of the war in Southeast Asia, locating downed air crewmen became a severe problem. Since heavy foliage often prevented the sighting of downed crewmen from the air, the need for a system of providing precise location information became apparent. This paper discusses the development, testing and deployment of the AN/ARD-21 Electronic Location Finder (ELF) System. The system is essentially a homing system which provides left/right and fore/aft information to the rescue helicopter. It consists of four spiral antennas, two UHF blade antennas, two receivers, and a control interface unit. Information is displayed on the Course Deviation Indicator (CDI) already in the helicopter. System accuracy of 15 feet radius in a hover has been demonstrated in tests. (Author)

**A73-35239 An introduction to a model of the human visual system.** M. Kabrisky (USAF, Institute of Technology, Wright-Patterson AFB, Ohio). In: NAECON 73; Proceedings of the National Aerospace Electronics Conference, Dayton, Ohio, May 14-16, 1973. New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. 297-303. 28 refs.

Description of a model of the human visual system based upon neurological connectivity data produced by anatomical dissection, in vivo physiological measurements, and psychological experimentation. The specific biological data believed to be significant in modeling visual information processes in the human central nervous system are

cited, and it is indicated why hardware implementation of the model leads to some especially useful pattern recognition machinery.

(Author)

**A73-35240 Spatial information coding in the human visual system - Psychophysical data.** A. Pantle (Wright State University, Dayton, Ohio). In: NAECON 73; Proceedings of the National Aerospace Electronics Conference, Dayton, Ohio, May 14-16, 1973. New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. 304-308.

One major theoretical account of spatial information processing in the human visual system asserts that spatial features of varying degrees of fineness (different spatial frequencies) are processed by different mechanisms or channels. The theory is supported by three different types of psychophysical evidence: (1) the contrast threshold for a test grating consisting of alternating dark and light bars is elevated by prior inspection of a high-contrast adapting grating, but only if the spatial frequencies of adapting and test gratings are similar; (2) the perceived spatial frequency of a suprathreshold grating is changed by adapting to a high-contrast grating of a slightly different spatial frequency; and (3) a complex grating whose component spatial frequencies are an octave apart appears uniform unless at least one of the components is of sufficient contrast (amplitude) to be resolved alone. (Author)

**A73-35241 Pattern recognition techniques suggested from psychological correlates of a model of the human visual system.** A. P. Ginsburg (USAF, Cambridge Research Laboratories, Bedford, Mass.). In: NAECON 73; Proceedings of the National Aerospace Electronics Conference, Dayton, Ohio, May 14-16, 1973. New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. 309-316. 21 refs.

Pattern recognition techniques were suggested which result from certain psychological correlates of a model of the human visual system based upon the low-pass spatial filtered Fourier transform. Recent research, primarily concerned with the human modulation transfer function, is shown to be relevant to imagery display systems and visual texture analysis. Additionally, an approach is suggested for automatic high-resolution radar target identification. (Author)

**A73-35242 Applications of a model of the human visual system to pattern recognition problems.** R. A. Gagnon (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). In: NAECON 73; Proceedings of the National Aerospace Electronics Conference, Dayton, Ohio, May 14-16, 1973.

New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. 317-321. 16 refs.

The research in pattern recognition presently being performed at the Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, is presented. A computer simulation of a model of the human foveal visual system is implemented in an Optical Character Reader and is being applied to an Aerial Reconnaissance detection task by use of a PDP-12 computer interfaced with a flying spot scanner. (Author)

**A73-35326 Studies in hearing conservation.** A. M. Martin, W. I. Acton, M. Lutman, and J. G. Walker (Southampton, University, Southampton, England). *Journal of Sound and Vibration*, vol. 28, June 8, 1973, p. 333-357. 48 refs.

This paper together with two companion papers comprise a review of the greater part of the research on hearing conservation carried out over the past ten years at the Institute of Sound and Vibration Research of the University of Southampton. The research described in this paper includes studies of temporary threshold shift from exposure to impulse noise and to mixtures of continuous and impulse noises, the establishment of damage risk criteria for gunfire and other types of impulse noise, the hazards to hearing from ultrasound and studies on the measurement of the attenuation of

hearing protection. The current state of ideas and research in these aspects of hearing conservation are discussed together with indications of possible future trends and requirements. Recent work on the extension of the damage risk criteria studies to the establishment of an equal energy principle for hearing damage for all types of noise is described in the first of the two companion papers, by Rice and Martin; the second companion paper, by Coles and Martin, is a review of certain medico-legal aspects of hearing conservation. (Author)

**A73-35327** Impulse noise damage risk criteria. C. G. Rice and A. M. Martin (Southampton, University, Southampton, England). *Journal of Sound and Vibration*, vol. 28, June 8, 1973, p. 359-367. 15 refs.

Consideration of the possibility of unifying damage risk criteria governing the effect of high-intensity impulse noise on hearing. An attempt is made to present a consensus of opinion on the prospects for unification of impulse noise damage risk criteria with the 'immission' principle of equivalent A-weighted sound energy for continuous noise exposure. It is concluded that the equal-energy concept may be the unifying factor in the formulation of a method for the assessment of hearing damage risk for all types of noise exposure. A.B.K.

**A73-35328** Human response to transportation noise and vibration. E. E. Zepler, B. M. Sullivan, C. G. Rice, M. J. Griffin, M. Oldman, P. J. Dickinson, K. P. Shepherd, J. E. Ludlow, and J. B. Large (Southampton, University, Southampton, England). *Journal of Sound and Vibration*, vol. 28, June 8, 1973, p. 375-401. 52 refs.

Research during the past decade at the Institute of Sound and Vibration Research, University of Southampton, on a number of aspects of human response to transportation noise and vibration is reviewed. These aspects include the following: sonic boom, subjective acoustics test procedures, human response to vibration, the effects of noise on performance and comfort, development of a mathematical model to determine the economic impact of achieving reduced community noise levels from aircraft, case studies of the effects on communities of aircraft noise and construction site noise. (Author)

**A73-35359** Some engineering aspects of clinical electroretinography. A. Troelstra (Rice University, Houston, Tex.) and C. A. Garcia (Texas, University, Houston, Tex.). In: Annual Southwestern Conference and Exhibition, 25th, Houston, Tex., April 4-6, 1973, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. 46-50. 9 refs. Grant No. NIH-5-S05-RR-07103.

Modeling, instrumentation, and data evaluation in electroretinography are considered with respect to clinical applications. Some results of Fourier analysis of ERG responses to sinusoidal light stimulation in both normal and abnormal human subjects are discussed in more detail. (Author)

**A73-35400** Nonadjectival rating scales in human response experiments. R. A. Hess (U.S. Naval Postgraduate School, Monterey, Calif.). *Human Factors*, vol. 15, June 1973, p. 275-280. 5 refs.

Twenty-two subjects participated in two tracking experiments for the purpose of determining the utility of a nonordinal, nonadjectival rating scale. The scale was devised in an effort to allow a human to quantify his subjective opinions of the characteristics of a system in situations where an adjectival scale would be inappropriate. The tracking task in both experiments was a compensatory one in which the human operator attempted to minimize the difference between a random-appearing input signal and the output of an unstable, controlled element. In the first experiment, ratings were generated by changing the degree of instability of the controlled element. In the second, the manipulator sensitivity was varied. The nonadjectival rating concept shows definite potential for use in a wide variety of situations in which human opinion is elicited. (Author)

**A73-35460** Responses to graded hypoxia at high and low 2,3-diphosphoglycerate concentrations. P. W. Rand, J. M. Norton, N. D. Barker, M. D. Lovell, and W. H. Austin (Maine Medical Center, Portland, Me.). *Journal of Applied Physiology*, vol. 34, June 1973, p. 827-832. 34 refs. Research supported by the John A. Hartford Foundation; Grant No. NIH-HE-07984.

Review of the results of a series of experiments in which changes in hemoglobin-oxygen affinity, produced through manipulation of 2,3-DPG concentrations in vivo, have been examined with respect to tissue oxygen availability. The tissue oxygen was measured by means of polarographic electrodes chronically implanted in the brain, kidneys, and muscles of 13 rabbits used in the experiments. The results indicate that these animals have maintained equivalent levels of tissue oxygen in the face of wide differences in 2,3-DPG through compensatory mechanisms believed to consist primarily in cardiac output changes. M.V.E.

**A73-35461** Cardiovascular responses to sudden strenuous exercise - Heart rate, blood pressure, and ECG. R. J. Barnard, G. W. Gardner, N. V. Diaco, R. N. MacAlpin, and A. A. Kattus (California, University, Los Angeles, Calif.). *Journal of Applied Physiology*, vol. 34, June 1973, p. 833-837. 12 refs. Research supported by the Los Angeles County Heart Association and Los Angeles Fire Fighters Protective League.

Cardiovascular responses to sudden strenuous exercise, without prior warm-up, were studied in adult males by way of electrocardiographic, heart rate, and blood pressure observations performed during and immediately after brief periods of high-intensity exercise. The obtained results indicate that such sudden exertion bursts lead to ischemic changes in the ECG. These changes are associated with an inordinate increase in systolic pressure and suggest an added catecholamine effect, in addition to the high metabolic demands created by the rapid increase in heart rate. M.V.E.

**A73-35462** Validation of open-circuit method for the determination of oxygen consumption. J. A. Wagner, S. M. Horvath, T. E. Dahms (California, University, Santa Barbara, Calif.), and S. Reed. *Journal of Applied Physiology*, vol. 34, June 1973, p. 859-863. 10 refs. Research supported by the California State Air Resources Board; Grant No. AF-AFOSR-69-1653.

Review of the results of experiments performed to test the validity of the open-circuit method for the determination of respiratory exchange. The results of 72 respiratory exchange measurements performed by both the open- and closed-circuit methods on ten subjects confirm the validity of the open-circuit method. M.V.E.

**A73-35463 \*** Validity of Haldane calculation for estimating respiratory gas exchange. U. C. Luft, L. G. Myhre, and J. A. Loeppky (Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.). *Journal of Applied Physiology*, vol. 34, June 1973, p. 864, 865. 8 refs. Contract No. NAS9-12572.

**A73-35474** The psychology of visual perception. R. N. Haber (Rochester, University, Rochester, N.Y.) and M. Hershenson (Brandeis University, Waltham, Mass.). New York, Holt, Rinehart and Winston, Inc., 1973. 407 p. 362 refs. \$12.50.

Perception as sensory organization is treated in terms of sensory processes in visual perception, sensory coding messages, the perception of color, psychophysical measurement and parameters, and temporal factors in visual perception. Perception as information processing is discussed, dealing with information processing of visual stimulation, figural synthesis and the perception of form, selection in visual search, selection in perception, and visual recognition and identification. Perception as spatial organization is considered, discussing two major points of view on the perception of space,

spatial information available to the perceiver, the perception of motion and movement, and the development of visual space perception. F.R.L.

**A73-35491** Amplitude of visual suppression during the control of binocular rivalry. L. C. Lack (Flinders University of South Australia, Bedford Park, Australia). *Perception and Psychophysics*, vol. 13, June 1973, p. 374-378. 20 refs.

To investigate the precise mechanism of control of binocular rivalry, subjects were instructed to attend actively to whichever pattern was momentarily in the nonsuppression phase. Test stimuli were presented tachistoscopically for recognition in either phase of rivalry. Because the differential recognition between nonsuppressed and suppressed phases was no greater for an active condition than for a passive viewing condition, it was concluded that control is not mediated by varying the amplitude of the suppression effect. This result was consistent with control that is exercised by selecting the eye to receive a constant-amplitude suppression. In addition, it was found that visual sensitivity of rivalry nonsuppression and nonrivalry were the same for the ocular dominant eye but different for the nondominant eye. (Author)

**A73-35492** Distance perception and the ambiguity of visual stimulation - A theoretical note. E. S. Eriksson (Uppsala, Universitet, Uppsala, Sweden). *Perception and Psychophysics*, vol. 13, June 1973, p. 379-381. 12 refs.

Certain current views postulate that visual perception, especially of distance, is a function of optical stimulation alone. It is shown here that the optical array does not, in fact, specify absolute distance unambiguously, for either a stationary or a moving object. In view of this ambiguity of optical information, a more complex theory, comprising both visual and nonvisual information, is needed to explain veridical perception. (Author)

**A73-35493** Factors affecting processing mode in visual search. H. Egeth, J. Atkinson, G. Gilmore, and N. Marcus (Johns Hopkins University, Baltimore, Md.). *Perception and Psychophysics*, vol. 13, June 1973, p. 394-402. 24 refs. Navy-supported research.

Visual search was studied under a variety of conditions to clarify some differences among the results of previous investigations and to provide a testing ground for models of visual information processing. Display configuration, target and field composition, exposure duration, and display size (up to 16 elements) were among the parameters investigated. In some conditions, mean reaction time was essentially invariant with display size, while in other conditions it increased substantially and linearly with display size. Current models of visual information processing were evaluated in the light of these and previous findings; all were found wanting. The data seem to demand a system subject to flexible cognitive control processes. (Author)

**A73-35494** Influence of stimulus symmetry on visual scanning patterns. P. J. Locher and C. F. Nodine (Temple University, Philadelphia, Pa.). *Perception and Psychophysics*, vol. 13, June 1973, p. 408-412. 18 refs.

Eye movements of four subjects performing a complexity rating task in which the stimuli consisted of random shapes differing in symmetry, number of turns (sides) in the perimeter, and structural angularity were examined. It was found that for both symmetrical and asymmetrical shapes, the number of fixations and fixation time increased directly with structural complexity (number of sides). Distributions of fixations for symmetrical shapes clustered in one-half of the shapes, while the distributions of fixations for asymmetrical shapes did not exhibit this one-sided bias. No differences were found in the distributions of fixation time to either half of asymmetrical or symmetrical shapes. The findings suggest that subject utilizes an organizing code in addition to the featural code in characterizing a given shape. The organizing code permits subject to generate the feature code for a given shape on the basis of partial information. (Author)

**A73-35495** On the perception of a class of bilaterally symmetric forms. R. Dobson (GM Research Laboratories, Warren, Mich.) and F. W. Young (North Carolina, University, Chapel Hill, N.C.). *Perception and Psychophysics*, vol. 13, June 1973, p. 431-438. 15 refs. NSF Grant No. GU-2059; Grant No. NIH-M-10006.

Two experiments were performed to determine the manner in which people perceive a class of bilaterally symmetric forms. In the first experiment, paired comparison dissimilarity judgments and unidimensional single-stimulus ratings were collected from the subjects. The second experiment involved the collecting of semantic-differential and paired-comparison dissimilarity judgments from two groups of subjects. The judgments and ratings from both experiments were compared to each other and to a set of objective measures of the forms by a series of multivariate statistical techniques. It was found that three primary attributes - orientation, convexity-concavity, and curvature - accounted for the perceptual reports, but the manner in which the attributes were used differed for different response procedures and for the same response on different occasions. (Author)

**A73-35496** On the rate of acquisition of visual information about space, time, and intensity. J. S. Lappin and O. J. Harm (Vanderbilt University, Nashville, Tenn.). *Perception and Psychophysics*, vol. 13, June 1973, p. 439-445. 13 refs. Grant No. PHS-MH-21105.

Experimental study of the temporal course of perceptual processing of stimuli varying in spatial position, intensity, and duration. It is shown that subjects can selectively attend to different attributes of the same stimulus and that the temporal characteristics of their perceptual processing depend upon the specific information which they are attempting to extract. Specifically, information about spatial position is shown to be acquired much more rapidly than is information about the intensity or duration of the stimulus. A.B.K.

**A73-35497** The superiority of the pair-comparisons method for scaling visual illusions. R. B. Howard, M. Wagner, and R. C. Mills (Colgate University, Hamilton, N.Y.). *Perception and Psychophysics*, vol. 13, June 1973, p. 507-512. 25 refs. Research supported by the Colgate Research Council and Sloan Foundation.

**A73-35498** Searching for many targets - An analysis of speed and accuracy. A. Yonas and J. Pittenger (Minnesota, University, Minneapolis, Minn.). *Perception and Psychophysics*, vol. 13, June 1973, p. 513-516. 10 refs. Grant No. NIH-1-P01-HD-05027.

Three subjects scanned matrices of letters for 40 sessions in a test of Neisser's claim that feature tests in high-speed searches operate independently and in parallel. In the multiple-target condition (MTC), the matrix contained any one of four target letters, while in the four single-target conditions (STC), the subject knew which particular target was embedded in the list. In contrast to previous studies, the error rates for individual target letters in the MTC were analyzed separately rather than being pooled. Two subjects made more errors on the hardest target when searched for in the MTC than in the STC. This difference would be masked by pooling error rates. The third subject's scanning rate in the MTC was not as rapid as in the STC. Neither a sequential nor a strictly parallel feature processing model can account for these data. (Author)

**A73-35627** A model of psychological annoyance of noise. H. S. Hayre (Houston, University, Houston, Tex.). In: *Electrical engineering - Service to mankind; Proceedings of the Southeast Region 3 Conference*, Louisville, Ky., April 30-May 2, 1973. New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. A-4-1 to A-4-4. 15 refs.

A mathematical model of psychological annoyance of noise is offered as a first order attempt to relate quantitatively the level of noise and the annoyance. This is believed to offer a desirable avenue so far as noise pollution is concerned since so far the fantastic amount

of data has been collected without any direct relationship with annoyance. Both continuous and intermittent as well as impulse type of noise are considered in this work. (Author)

**A73-35645** Frequency analysis of spatio-temporal visually evoked cortical potentials during binocular rivalry. J. R. Bourne, R. F. Stamps, Jr., and R. Fox (Vanderbilt University, Nashville, Tenn.). In: *Electrical engineering - Service to mankind; Proceedings of the Southeast Region 3 Conference, Louisville, Ky., April 30-May 2, 1973.* New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. P-6-1 to P-6-4. 11 refs. NSF Grant No. GK-27863.

Visually evoked cortical potentials (VECPs) were measured from four bipolar bioccipital orthogonal electrode pairs during dominant and suppressed phases of binocular rivalry. Both rivalry and VECPs were elicited by shifting contour gratings presented on cathode ray tubes. VECPs were analyzed both visually and by Fourier transformation. (Author)

**A73-35657** Is anyone out there - Evidence for the existence of extraterrestrial life. P. M. Molton (Maryland, University, College Park, Md.). *Spaceflight*, vol. 15, July 1973, p. 246-252. 21 refs.

Evaluation of pros and cons concerning the existence of extraterrestrial life in the universe. Reflections are made regarding the properties of other biochemistries and the mental and moral characteristics of other life if it exists. V.Z.

**A73-35804 \*** Imaging and life detection. E. L. Merek (NASA, Ames Research Center, Moffett Field, Calif.). *BioScience*, vol. 23, Mar. 1973, p. 153-159. 33 refs.

Recent opportunities to search for extraterrestrial life resulted in discussions on the use of imaging and the instrument development required for this purpose. Imaging observations to detect extraterrestrial organisms have been made on lunar samples and meteorites, and have been suggested for experiments on the surface of Mars. To evaluate further the morphologic approach and its application to exobiology, a model system based on Leduc's (1911) 'synthetic biology' was constructed and the resulting particles were compared with recognized microfossil particles. F.R.L.

**A73-35856** Physiological problems of space travel. R. W. Bullard (Indiana University, Bloomington, Ind.). *Annual Review of Physiology*, vol. 34, 1972, p. 205-234. 89 refs. USAF-supported research. (AFOSR-72-2451TR)

The space traveler is concerned with two acceleration problems, including overall tolerance and the ability to perform in the acceleration environment. The types of acceleration to be considered are vibration or oscillation, impact accelerations, and sustained linear or angular acceleration. Problems of terminology and standardization in studies of physiological acceleration effects are discussed together with questions of acceleration exposure during manned space flight. Effects on the cardiovascular system are investigated along with the renal function and body fluid regulation, respiration, and aspects of training status. The influence of weightlessness is also considered, giving attention to cardiovascular deconditioning, blood volume, general cardiovascular alterations, respiration, bone and electrolyte metabolism, alteration of work capacity, and metabolic problems. G.R.

**A73-35860** Biomedical instrumentation and measurements. L. Cromwell (California State University, Los Angeles, Calif.), F. J. Weibell, E. A. Pfeiffer, and L. B. Usselman (U.S. Veterans Administration, Biomedical Engineering and Computing Center, Sepulveda, Calif.). Englewood Cliffs, N.J., Prentice-Hall, Inc., 1973. 457 p. 92 refs. \$16.95.

The man-instrument system is considered together with the sources of bioelectric potentials, electrodes, the cardiovascular

system, cardiovascular measurements, aspects of patient care and monitoring, and measurements in the respiratory system. Other topics examined include the measurement of physical variables, the nervous system, instrumentation for sensory measurements and the study of behavior, biotelemetry, instrumentation for the clinical laboratory, and the role of the computer in biomedical instrumentation. The electrical safety of medical equipment is also discussed, giving attention to physiological effects of electrical currents, shock hazards from electrical equipment, and special safety measures for electrically susceptible patients. G.R.

**A73-35863 \*** Changes in functional construction of bone in rats under conditions of simulated increased gravity. E. Amtmann (Köln, Universität, Cologne, West Germany) and J. Oyama (NASA, Ames Research Center, Environmental Physiology Div., Moffett Field, Calif.). *Zeitschrift für Anatomie und Entwicklungsgeschichte*, vol. 139, 1973, p. 307-318. 21 refs.

An investigation was conducted to determine experimentally whether femur bones are altered in cross-sectional area or cross-sectional shape by chronic centrifugation at different G-levels in conformance to Wolff's law. It was found that the centrifuged animals exhibit on the average smaller body masses, femur lengths and femur cross sections, as compared to their corresponding age controls. The mean inhibitory effect of chronic centrifugation upon body and femur growth can be measured in a shortcut approximation by calculating the decrease of body masses and femoral dimensions on a percentage basis. G.R.

**A73-35869 #** Safety measures in aviation industry (Okhrana truda v aviatsionnoi promyshlennosti). N. N. Kolotilov, A. M. Kazakov, N. S. Troianskii, and F. S. M. Iunusov. Moscow, Izdatel'stvo Mashinostroenie, 1973. 296 p. 55 refs. In Russian.

Methods of protecting workers from poisonous and harmful substances and creating safe working conditions are examined. Techniques used to analyze working conditions and to determine the causes of casualties and accidents are described, and means of providing adequate ventilation and lighting are outlined. The effects of such factors as noise, ultrasound, vibrations, and ionizing and electromagnetic radiation on the human organism are studied, together with the respective countermeasures. Particular attention is given to methods of protection against high-voltage currents and high pressures, and of protection during engine tests. V.P.

**A73-35896** Primary and initial processes of the biological action of radiation (Pervichnye i nachal'nye protsessy biologicheskogo deistviia radiatsii). Edited by G. G. Afanas'ev. Moscow, Izdatel'stvo Nauka, 1972. 274 p. In Russian.

The effects of ionizing radiation at various levels of biological organization are reviewed. Topics discussed include the effects of radiation on the structure of DNA and RNA, the effects of primary radiotoxins on cell structure, radiation-induced chemiluminescence of lipids, the role of free radicals in cell structural changes caused by radiation, radiation damage to bone marrow, mechanisms of cell damage and recovery, the radiation-counteracting action of compounds containing sulfhydryl groups, the effect of oxygen pressure on the response to ionizing radiation, early structural changes of nucleoproteins in irradiated cells and mitochondria, the possibility of increasing the radiation death toll of bacteria with the aid of certain sensitizers, and the effect of radiation on the blood-producing organs of animals. A.B.K.

**A73-35922** Stereoscopic vision - Cortical limitations and a disparity scaling effect. C. W. Tyler (Northeastern University, Boston, Mass.). *Science*, vol. 181, July 20, 1973, p. 276-278. 22 refs.

Research supported by the Foundations Fund for Research in Psychiatry.

The spatial limitations of stereoscopic vision were studied by using vertical line stimuli containing sinusoidal disparity variations such that different parts of the line appeared at different depths. Stimuli with a finer grain than about 3 cycles per degree did not elicit depth perception, even though the sinusoidal curvature was clearly visible monocularly. At low spatial frequencies of curvature, stereoacuity was limited to the same extent as the monocular sensitivity. The limiting disparity for Panum's fusional region and the upper depth limit are subject to a scaling effect in proportion to stimulus dimensions. The disparity scaling can be characterized by a fixed maximum angular difference between the parts of the stereoscopic half-images. (Author)

**A73-35923 Gravity, weightlessness and organismic genetic structures.** N. P. Dubinin and E. N. Vaulina (Akademii Nauk SSSR, Moscow, USSR). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 27 p. 73 refs.*

Evidence has been obtained concerning the role of gravity in the evolution of organisms and their development. A number of adaptations to the gravitational force can be observed in the organisms after they went to live on the land. Every organism has developed a specialized organ of orientation. The evolution of supporting structures determining the form of the organism and the location of the organs was expressed in the development of a skeletal-muscular system in animals and a conductive skeletal tissue system and specialized supporting organs in plants. Changes produced in man and other biological organisms due to the absence of the gravitational environment during long space flights are discussed, giving attention also to an elongation of the life span of the *Drosophila* females exposed to space. G.R.

**A73-35946 # Experimental methods of correlation between the trajectories of cosmic heavy ions and biological objects: Dosimetric results - Experiment Biostack on Apollo XVI and XVII.** R. Pfohl, R. Kaiser, J. P. Massue, and P. Cüer (Strasbourg, Université, Strasbourg, France). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 12 p.*

The emulsions used in the investigation were obtained with the aid of the temperature process. The determination of the parameters for the calculations is considered, giving attention to problems of position identification in the case of heavy ions, length measurements, calculations of basic data for the photometrical studies, and questions of track detection. Theoretical aspects regarding the dosimetry of heavy ions are discussed together with the approaches used in the calibration, details of the interaction of the cosmic rays with the emulsion, and the calculation of the local dose in a sphere with a diameter of 10 microns. (Author)

**A73-35963 \* # A monkey metabolism pod for space-flight weightlessness studies.** N. Pace, D. F. Rahlmann, A. M. Kodama, R. C. Mains, and B. W. Grunbaum (California, University, Berkeley, Calif.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 18 p. 7 refs. Grant No. NGL-05-003-024.*

The system described will permit quantitative physiological studies in adult monkeys, weighing from 8 to 14 kg, during future space flights. The system comprises a fiberglass pod containing a comfortable restraint couch for the animal. The pod is divided into upper and lower halves. When the monkey occupies the couch, a rubber belly-band forms a gas seal between the upper and lower portions of the animal. The upper-pod ventilating air stream is monitored for the partial pressures of oxygen, carbon dioxide, nitrogen, and water to permit continuous metabolic gas-exchange measurements for computation of metabolic energy expenditure. The lower pod is lined with ashless filter paper for excreta collection.

G.R.

**A73-35966 \* # Ten years of development of the Planetary Quarantine Program of the United States.** L. B. Hall (NASA, Washington, D.C.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 31 p.*

Review of the significant achievements in quantitatively defining the quarantine problems and in developing usable values for key quarantine parameters describing biocidal effects of outer space, the release of microorganisms from spacecraft reaching other planets, and terrestrial microbial growth on other planets. Advances in compliance methods and techniques resulting from this research effort are also summarized with emphasis upon decontamination/sterilization, selecting of a standardized test organism and the assay of surface and buried contamination. As a result of this work, the United States can continue to assure fulfillment of international agreements for safeguarding the planets of our solar system with minimum burden placed upon space exploration programs. (Author)

**A73-35978 \* # Lunar sample quarantine procedures - Interaction with non-quarantine experiments.** M. B. Duke and M. A. Reynolds (NASA, Johnson Space Center, Houston, Tex.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 16 p. 7 refs.*

The quarantine requirements and biomedical testing of lunar samples interacted with the preliminary physical sciences examination of the samples to create conditions which degraded samples for some experiments. Vacuum systems constructed for sample handling proved inadequate; stainless steel biological containment cabinets purged with dry nitrogen at slightly lower than atmospheric pressure, with autoclaves or sterilizers on entrances or exits, were more satisfactory, but leaks introduced atmospheric contamination. Sterilization of sample handling systems and sample transfer containers introduced organic contaminants. Analytical equipment built into glove box systems was clumsy and less sensitive than necessary. Sample requirements for quarantine testing competed with those for physical and chemical experiments. Experience gained in the lunar quarantine should provide basic information on the design of planetary sample quarantine facilities and procedures that can minimize the hazards and maximize the scientific return. (Author)

**A73-35979 # Histological studies on the vestibular organ of frog embryos and larvae after the influence of simulated weightlessness.** W. Briegleb (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 7 p. 9 refs.*

**A73-35980 # Gravitational stress and exercise.** H. Bjurstedt, G. Rosenhamer, and G. Tyden (Karolinska Institutet, Stockholm, Sweden). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 10 p. 10 refs.*

Investigation of some of the effects of gravitational forces on certain circulatory and metabolic adjustments to physical exercise. It is shown that, when the force of gravity is increased to three times its normal value, leg exercise produces a much more marked increment in stroke volume than in heart rate, in contrast to the case of the same exercise at normal gravity. M.V.E.

**A73-35981 # Osseous malrepair in calcium-deficient states.** J. R. Beljan (California, University, Davis, Calif.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 19 p. 12 refs.*

Investigation of the effect of chronic decalcification on the repair of an experimental cortical bone defect. The results obtained indicate that osseous repair of an induced cortical bone defect can be partially or almost totally inhibited by prior treatment with a low calcium diet. Administration of supplementary dietary calcium following chronic treatment with calcium deficient rations does not alleviate the repair inhibition. M.V.E.

**A73-35982 #** Metabolic responses of monkeys to increased gravitational fields. A. H. Smith, D. F. Rahlman, A. M. Kodama, and N. Pace (California, University, Davis; California, University, Berkeley, Calif.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 10 p. 26 refs.*

A depletion of body fat has been reported by several investigators for various species of homiotherms exposed to chronic acceleration. Generally the effect is proportional to field strength, and over the size range examined (0.25 to 5 kg), it becomes more severe in larger animals. There is some evidence that this may be the result of increased secretion of a pituitary hormone, the fat mobilizing substance FMS. An exception to the defatting effect of chronic acceleration was observed in mature pig-tailed monkeys (*Macaca nemestrina*), although they exhibited other changes generally found in homiotherms exposed to hyperdynamic environments. It is considered that this unusual primate response to chronic acceleration may result from a different geometry of the central nervous system, and its effect upon gravity load distribution in the lower part of the brain. (Author)

**A73-35983 \* #** The pathology of inactivation in monkeys. G. H. Bourne, M. N. Golarz de Bourne, H. McClure, and M. Keeling (Emory University, Atlanta, Ga.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 3 p. Grants No. NGR-11-001-016; No. NIH-RR-00165.*

Progress report on a long-term experiment using rhesus monkeys and designed to study the effects of isolation up to one year, as well as the effects of bed rest simulated by immobilization in a plaster cast for six months. The investigation includes histopathological and histochemical studies of these effects on various internal organs and tissues, and some of the preliminary results of these studies are presented and discussed. M.V.E.

**A73-35984 #** Influence of simulated weightlessness on the mutational rate of *Tribolium confusum*. W. Briegleb, J. Neubert, A. Schatz, and F. Schuster (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 14 p. 9 refs.*

Review of the results of a study of zero-gravity effects performed upon whole cultures of the flour beetle *Tribolium confusum* exposed to weightlessness by the high-speed clinostat method. These results show a qualitative agreement with those obtained in the American Biosatellite-2 study of weightlessness effects upon the flour beetle. M.V.E.

**A73-35985 #** Normalisation of haemodynamic changes caused by action of prolonged accelerations in rats. M. Wojtkowiak (Instytut Medycyny Lotniczej, Warsaw, Poland). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 10 p. 11 refs.*

Study of the nature and endurance of the effects of +5 Gz acceleration on rats subjected to centrifugation for 1 hr. The results obtained include the finding that the hemodynamic changes caused by centrifugation consist of blood stasis and extravascular displacement of proteins. M.V.E.

**A73-35997 #** Survival and mutability of *Chlorella* under various orientation in the earth's gravitational field. E. N. Vaulina and I. D. Anikeeva (Akademiia Nauk SSSR, Moscow, USSR). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 13 p. 8 refs.*

Study of the influence of temperature, storage length, and cell orientation with respect to the earth's gravitational field on survival and mutability of *Chlorella* cells. It has been shown that an increase in the duration of storage at low and high (sublethal) temperatures leads to a decrease in the viability and an increase in the mutation frequency of cultures. Cell orientation has an effect only at 36.6°C. In the inverse variant (the surface of the nutrient medium is turned down) the survival of cultures decreases and their mutability increases. (Author)

**A73-36098** Effect of dynamic factors of space flights on green alga *Chlorella vulgaris*. E. V. Moskvitin and E. N. Vaulina (Akademiia Nauk SSSR, Moscow, USSR). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 15 p. 14 refs.*

The effect of vibrational and linear acceleration on physiological and genetic parameters of alga *Chlorella vulgaris* Beijer was studied. A strictly periodic vibration in the frequency range of from 4 to 4000 Hz with linear acceleration up to 16 g did not affect the survival and mutability of *Chlorella* cells and did not modify the effects of acute gamma-radiation. However, a random vibrational process similar in its characteristics to that of realized during the launching of spacecraft, combined with linear acceleration, increased the following radiation damage to algae caused by acute gamma-radiation at a dose of 10,000 r. This effect is characteristic only of cells at the beginning of the G sub 1-stage. (Author)

**A73-36100 \* #** Spacecraft microbial burden reduction due to atmospheric entry heating - Jupiter. C. C. Gonzalez, W. Jaworski, A. D. McDonald, and A. R. Hoffman (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 15 p. 6 refs. Contract No. NAS7-100.*

An effort has been underway at Jet Propulsion Laboratory to develop the tools necessary to predict temperature histories for a typical spacecraft during inadvertent entry. In order that the results have general applicability, parametric analyses are performed. The thermal response of the spacecraft components and debris resulting from disintegration is determined. The temperature histories of small particles and composite materials, such as thermal blankets and an antenna, are given special attention. Guidelines are given to indicate the types of components and debris most likely to contain viable organisms, which could contaminate the lower layers of the Jovian atmosphere. (Author)

**A73-36116 #** Analysis of the extravehicular activity of an astronaut (Analiz deiatel'nosti kosmonavta pri rabote v otkrytom kosmose). E. V. Khrunov. *Kosmicheskie Issledovaniia*, vol. 11, May-June 1973, p. 470-477. 5 refs. In Russian.

The motions of an astronaut during the execution of extravehicular assignments are analyzed. Formulas are given to describe his hand movements as a function of time in slow motion photographs. Criteria are proposed for the evaluation of his extravehicular training performance. The positive effects of training on the extravehicular activity of Soviet astronaut Leonov are noted. Leonov's and Beliaev's heart beat rates during various phases of their extravehicular activities are discussed. Algorithms are proposed for some extravehicular assignments. V.Z.

**A73-36117 #** Cytogenetic analysis of diploid and autotetraploid *Crepis capillaris* seeds following space travel on the 'Cosmos-368' artificial earth satellite (Tsitogeneticheskii analiz semian diploidnogo i autotetraploidnogo *Crepis capillaris* posle poleta na iskusstvennom sputnike zemli 'Kosmos-368'). R. N. Platonova. *Kosmicheskie Issledovaniia*, vol. 11, May-June 1973, p. 478-481. 15 refs. In Russian.

**A73-36125 #** Retinal change induced in the primate *Macaca mulatta* by oxygen nuclei radiation. C. H. Bonney, F. N. Beckman (USAF, School of Aerospace Medicine, Brooks AFB, Tex.), and D. M. Hunter (USAF, Wilford Hall Medical Center, Lackland AFB, Tex.). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 12 p. 22 refs.*

Retinas of primates (*Macaca mulatta*) were exposed to oxygen nuclei at the Bevatron, Berkeley, California. Color fundus photographs and fluorescein angiograms were taken of the retinas prior to irradiation and up to 5 weeks after exposure. Animals were sacrificed

at postexposure intervals for histopathologic examination of the retinas. A series of animals were exposed to 200 KVP X-rays and examined on the same regime as the first series. The results showed a low rad equivalent dose for retinal damage as compared with the X-ray series, i.e. a high quality factor, and a marked compression of the latency between exposure and onset of the retinal pathology.

(Author)

**A73-36129 Preliminary results of the action of cosmic heavy ions on development of eggs of *Artemia salina*.** W. Rüther, E. H. Graul (Marburg, Universität, Marburg, West Germany), W. Heinrich, O. C. Altkofer (Kiel, Neue Universität, Kiel, West Germany), R. Kaiser, and P. Cuer (Strasbourg, Université, Strasbourg, France). *COSPAR, Plenary Meeting, 16th, Konstanz, West Germany, May 23-June 5, 1973, Paper. 12 p. 12 refs.*

**A73-36428 Properties of biological fluids and solids: Mechanics of tissues and organs; Proceedings of the Biomechanics Symposium, Georgia Institute of Technology, Atlanta, Ga., June 20-22, 1973.** Symposium sponsored by the American Society of Mechanical Engineers. Edited by Y. C. Fung (California, University, San Diego, Calif.) and J. A. Brighton (Pennsylvania State University, University Park, Pa.). New York, American Society of Mechanical Engineers, 1973. 109 p. Members, \$9.60; nonmembers, \$12.

The properties of biological fluids and solids are considered, giving attention to the bioconcave equilibrium states of a red blood cell in osmotic swelling, a microcontinuum model of blood with deformable cells, a mathematical model of the human skin as a thin elastic membrane, and the nonlinear viscoelastic behavior of arteries. Other subjects discussed are related to the mechanics and the physiology of organs, the flow of biological fluids, the mechanics of bones, and the analysis and measurements of natural and artificial organs.

G.R.

**A73-36429 A distributed parameter model of the inertially loaded human spine.** H. Cramer, Y. K. Liu, and D. U. von Rosenberg (Tulane University, New Orleans, La.). In: Properties of biological fluids and solids: Mechanics of tissues and organs; Proceedings of the Biomechanics Symposium, Atlanta, Ga., June 20-22, 1973. New York, American Society of Mechanical Engineers, 1973, p. 47, 48. Contract No. F33615-72-C-1212.

This abstract describes the development and solution of a nonlinear continuum model of the human spinal response to impact. Although the results obtained emphasize the caudocephalad (+G sub z) acceleration or pilot ejection problem, the model is applicable to any combinations of the acceleration vector within the midsagittal plane.

(Author)

**A73-36430 Biomechanics of the semicircular canals.** W. C. Van Buskirk and J. W. Grant (Tulane University, New Orleans, La.). In: Properties of biological fluids and solids: Mechanics of tissues and organs; Proceedings of the Biomechanics Symposium, Atlanta, Ga., June 20-22, 1973. New York, American Society of Mechanical Engineers, 1973, p. 53, 54. Research supported by the Bush Foundation; NSF Grant No. GK-27804.

The principal components of a semicircular canal are the narrow duct, the utricle, and the ampulla, which contains the cupula, the system transducer. When the canals are subjected to angular acceleration, the fluid in the canal, called endolymph, tends to lag behind because of its inertia. This relative motion of fluid within the canal deflects the cupula, which initiates a neural message to the central nervous system. The semicircular canal duct is approximated for initial study as a section of a rigid torus filled with an incompressible Newtonian fluid.

G.R.

**A73-36431 A non-Newtonian model for fluid flow in the semicircular canals.** W. C. Van Buskirk and E. W. Morse (Tulane University, New Orleans, La.). In: Properties of biological fluids and solids: Mechanics of tissues and organs; Proceedings of the Biomechanics Symposium, Atlanta, Ga., June 20-22, 1973.

New York, American Society of Mechanical Engineers, 1973, p. 55, 56. Research supported by the Bush Foundation; NSF Grant No. GK-27804.

**A73-36432 Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971.** Symposium supported by the Deutsche Forschungsgemeinschaft. Edited by J. Dichgans (Freiburg, Universität, Freiburg im Breisgau, West Germany) and E. Bizzi (MIT, Cambridge, Mass.). Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972. 416 p. \$33.60.

The behavior of eye movement motoneurons in the alert monkey is considered together with the neuronal mechanism of nystagmus, the electrophysiological investigation of the organization of the vestibulo-ocular pathways in rabbits, the functional characteristics of the superior colliculus of the Rhesus monkey, and aspects of optomotor integration in the colliculus superior of the cat. Other subjects investigated include neuronal elements of the orienting response, frontal eye-field lesions in monkeys, saccade correlated events in the lateral geniculate body, and supranuclear structures regulating binocular eye and head movements. Questions of the adaptive control of saccadic eye movement are also examined along with the principles of optomotor reactions in insects.

G.R.

**A73-36433 The behavior of eye movement motoneurons in the alert monkey.** D. A. Robinson and E. L. Keller (Johns Hopkins School of Medicine, Baltimore, Md.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971.

Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 7-16. 16 refs. Grant No. NIH-EY-00598.

Three devices are chronically implanted in rhesus monkeys, including a light aluminum crown bolted to the skull and a coil of wire threaded onto the globe beneath the four recti insertions. The ends of this coil pass subcutaneously to a connector mounted on the skull. When the animal is placed in two alternating magnetic fields, a voltage is generated in the eye coil, whose amplitude and phase is a function of eye position. The results obtained in the tests are discussed, giving attention to fixation, rate-position relationship, rate-velocity relationship, the descriptive equation, vergence movements, saccades, vestibular slow phases, and forced ductions.

G.R.

**A73-36434 Unit activity in the brainstem related to eye movement - Possible inputs to the motor nuclei.** A. F. Fuchs and E. S. Luschei (Washington, University, Seattle, Wash.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971.

Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 17-27. 9 refs. Grants No. NIH-RR-00166; No. PHS-RO1-NB-08596-02; No. PHS-1-RO1-EY-99745-01.

Based on their activity related to saccadic eye movements on one hand and fixation and smooth pursuit movements on the other, almost all of the brainstem units could be placed into one of four categories. These categories included burst-tonic units which exhibited a burst of activity for saccades in the 'on' direction and a tonic firing. Another category comprised burst units which exhibited a burst of firing for saccades in the 'on' direction and either no activity or irregular firing during fixation. The third category was made up of tonic units which exhibited an increasing rate for fixation or smooth pursuit eye movement in the 'on' direction. The fourth category contained pause units which exhibited an essentially constant firing frequency during all smooth pursuit eye movements but a pause in activity during saccades.

G.R.

**A73-36435** Concerning the supranuclear organization of eye movements. G. Westheimer and S. M. Blair (California, University, Berkeley, Calif.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 28-35. 14 refs. Grant No. PHS-EY-00593.

There are at present two reasons for a study of the supranuclear connections to the oculomotor nuclei. Knowledge of the cortical and vestibular inputs to the oculomotor system is reaching a state of sophistication in which it is no longer satisfying merely to catalog the situations producing eye movements, but appropriate to examine the relationship between the stimulus situation and the eye movements. The other reason is the increasingly firm foundation on which knowledge of the peripheral oculomotor apparatus now rests. The interrelationship between vertical and horizontal conjugate eye movements is discussed. F.R.L.

**A73-36436** The origin of quick phases of nystagmus in the horizontal plane. B. Cohen and V. Henn (Mount Sinai School of Medicine, New York, N.Y.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 36-55. 65 refs. Grant No. PHS-00294.

The data presented support the hypothesis that saccades and quick phases of nystagmus in the horizontal plane are generated in the pontine reticular formation. The preservation of nystagmus after ablation of the cerebrium is considered together with the persistence of nystagmus after ablation of the superior colliculi, the cerebellum, the vestibular nuclei or the medulla. Potential changes in the paramedian zone of the pontine reticular formation (PPRF) associated with eye movements are considered along with eye movements induced by stimulation of the PPRF, conjugate gaze paralysis and PPRF lesions, and unit activity in the PPRF associated with rapid eye movements. G.R.

**A73-36437** The neuronal mechanism of nystagmus. G. Horscholt-Bossavit and S. Tyc-Dumont (Paris, Université, Laboratoire de Physiologie, Paris, France). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971.

Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 61-70. 19 refs.

Aspects of the excitability of motoneurons during one nystagmic cycle are considered together with questions of the excitability of secondary vestibular fibers during nystagmus and the properties of the inhibitory nystagmic interneurons (INI). A schema of the hypothetical operations in the nystagmic system is presented. The tonic input of a labyrinthine origin excites the abducens motoneurons through the short three-neuron arc. Simultaneously, the same vestibular volley brings sets of interneurons to discharge. The vestibular volley generates a simultaneous inhibition of the INI. G.R.

**A73-36438** Vestibular and cerebellar control of oculomotor functions. W. Precht (Max-Planck-Institut für Hirnforschung, Frankfurt am Main, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971.

Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 71-88. 43 refs.

Direct physiological evidence is presented for the existence of a three-neuronal arc connecting the labyrinth and the extraocular muscles. It is shown that even long latency events occurring in ocular motoneurons following labyrinthine stimulation may readily be explained by cerebellar modulation of the transmission through the medial longitudinal fascicle. The natural stimulation of the labyrinth is discussed together with the electrical stimulation of the vestibular nerve and the effects of cerebellar stimulation on the vestibulo-ocular reflex. G.R.

**A73-36439** Cholinergic activation of vestibular neurones leading to rapid eye movements in the mesencephalic cat. U. Thoden (Freiburg, Universität, Freiburg im Breisgau, West Germany), O. Pompeiano (Pisa, Università, Pisa, Italy), and P. C. Magherini. In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 99-108. 35 refs. Research supported by the Consiglio Nazionale delle Ricerche; Grant No. PHS-NB-07685-03.

**A73-36440** Vestibular and spinal control of eye movements. J.-I. Suzuki (Teikyo University, Tokyo, Japan). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971.

Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 109-115. 6 refs. Research supported by the Naito Science Foundation; Grant No. PHS-NB-06585.

Eye deviations induced by otolith organs and neck, by neck and by semicircular canals, and nystagmus induced in the head-hanging position are studied. When a rabbit's head and body are tilted to the side, the strongest compensatory eye movement occurs in the coronal plane, which is the plane of tilt. The eyes also shift laterally. Neck-induced eye movements were studied in a human subject. Eye movement recordings showed deviations corresponding to the sinusoidal twist of the neck. Rabbits were studied to clarify the phase shift between eye deviation and body twist. Data are given showing how activity induced in vestibular and spinal receptors is integrated in the oculomotor system. The data also demonstrate noncompensatory movements of the eyes which occur in upside-down head positions. F.R.L.

**A73-36441** Cross coupling between effects of linear and angular acceleration on vestibular nystagmus. L. R. Young (MIT, Cambridge, Mass.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 116-121. 11 refs.

**A73-36442** Some functional characteristics of the superior colliculus of the Rhesus monkey. P. H. Schiller (MIT, Cambridge, Mass.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 122-129. 8 refs.

**A73-36443** Optomotor integration in the colliculus superior of the cat. M. Straschill and P. Rieger (Max-Planck-Institut für Psychiatrie, Munich, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971.

Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 130-138. 9 refs.

**A73-36444** Neuronal elements of the orienting response - Microrecordings and stimulation experiments in rabbits. K.-P. Schaefer (Göttingen, University, Göttingen, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 139-148. 21 refs. Research supported by the Deutsche Forschungsgemeinschaft.

**A73-36445** The role of the superior colliculus in visually-evoked eye movements. R. H. Wurtz and M. E. Goldberg (National Institute of Mental Health, Laboratory of Neurobiology, Bethesda, Md.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 149-158. 11 refs.



**A73-36446** Frontal eye-field lesions in monkeys. R. Latt and A. Cowey (Cambridge University, Cambridge, England). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 159-168. 28 refs.

Unilateral removal of one frontal eye-field (FEF) in monkeys produces three striking changes in behavior. Contralateral visual stimuli are neglected. The eyes and head are deviated to the ipsilateral side and the animal commonly circles in an ipsilateral direction. There is a strong preference for the ipsilateral hand. Perimetry experiments are described which were designed to analyze quantitatively the effects of FEF lesions on monkeys' visual fields, to compare bilateral and unilateral lesions, and to test explanations for the origins of contralateral visual neglect by controlling for head and eye movements and having stimulus and response spatially independent. Visual search was also tested. F.R.L.

**A73-36447** Cerebellar ablations and spontaneous eye movements in monkey. J. C. Aschoff and B. Cohen (Mount Sinai School of Medicine, New York, N.Y.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 169-177. 21 refs. Grant No. PHS-NS-00294.

**A73-36448** Lateral geniculate body structure and eye movement. J. Szentagothai (Semmelweis Orvostudományi Egyetem, Budapest, Hungary). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 178-188. 27 refs.

Suggestion of a possible anatomical basis for interactions conveyed to the lateral geniculate body (LGB) from the brain stem reticular formation and even perhaps from the frontal motor cortical system. For this purpose, a study is made of the neuron arrangement and synaptic structure in the dorsal nucleus of the LGB, and a description is given of the connection of the so-called perigeniculate nucleus (PGN). Some comments are made regarding the possibility that reticular influences upon geniculate neurons proper might be mediated through the PGN and regarding the possibility that the PGN might also be able to mediate to the LGB the influence of cortical oculomotor impulses. A.B.K.

**A73-36449** Saccade correlated events in the lateral geniculate body. M. Jeannerod. In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 189-198. 26 refs.

Review of experiments devoted to the study of saccade correlated events in terms of either a mass 'response' of the lateral geniculate body (LGB) to active eye movements, or of a change in the discharge rate of single geniculate units. Geniculate eye movement potentials and postsaccadic discharge rate changes in LGB units are accordingly discussed, along with the timing of saccade correlated events. M.V.E.

**A73-36450** Neurophysiological correlates of eye movements in the visual cortex. O. Creutzfeldt, H. Noda, and R. B. Freeman, Jr. (Max-Planck-Institut für Psychiatrie, Munich, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 199-206. 20 refs.

**A73-36451** Supranuclear structures regulating binocular eye and head movements. R. Hassler (Max-Planck-Institut für Hirnforschung, Frankfurt am Main, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 207-219. 30 refs.

Results of a determination of the supranuclear final common pathway for various types of binocular movements and substituting head movements in the cat. It is shown that the interstitial nucleus with its ascending and descending connections represents the supranuclear final common pathway for rotatory eye and head movements in the brain stem. The praetistal nucleus with all its connections represents the tonically active supranuclear common pathway for raising movements. The precommissural nucleus with the descending efferent and the short ascending connections represents the supranuclear final common pathway for lowering movements. The three efferent pathways of the adverse systems meet one another after crossing the midline in a narrow strip of periaqueductal reticular formation which represents the supranuclear final common pathway for horizontal movements of the eyes and head. A.B.K.

**A73-36452** Central programming and peripheral feedback during eye-head coordination in monkeys. E. Bizzi, R. E. Kalil, P. Morasso, and V. Tagliasco (MIT, Cambridge, Mass.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 220-232. 11 refs. Research supported by the Consiglio Nazionale delle Ricerche and Sloan Foundation; Grant No. NIH-NS-09343.

**A73-36453** The control of eye movements in the saccadic system. W. Becker (Ulm, Universität, Ulm, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 233-243. 12 refs. Research supported by the Deutsche Forschungsgemeinschaft.

Review of the conduct and results of three experiments on eye movement control in the saccadic system. The basic properties of corrective eye movements, verification of a hypothesis about the short latencies of corrective movements, and location of the inaccuracy source that makes corrective movements necessary are the respective objects of the experiments reviewed. M.V.E.

**A73-36454** Comparative physiology of movement-detecting neuronal systems in lower vertebrates/anura and urodela/. O.-J. Grüsser and U. Grüsser-Cornehl (Berlin, Freie Universität, Berlin, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 260-273. 11 refs. Research supported by the Deutsche Forschungsgemeinschaft.

**A73-36455** Rabbit optokinetic reactions and retinal direction-selective cells /A preliminary model/. H. Collewijn, C. W. Oyster, and E. Takahashi (Rotterdam, Medical Faculty, Rotterdam, Netherlands). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 280-287. 12 refs.

**A73-36456** Investigations of the eye tracking system through stabilized retinal images. G. Kommerell and R. Tümmel (Freiburg, Universität, Freiburg im Breisgau, West Germany). In:

Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 288-297. 20 refs. Research supported by the Deutsche Forschungsgemeinschaft.

Investigation of eye movements occurring during the tracking of slowly moving targets under conditions where the normal functioning of feedback in the eye movement control system is prevented by rigidly stabilizing the retinal image. In this study the retinal image was stabilized by using two independent methods: (1) the production of afterimages and (2) the use of a suction cap technique. It is found that under the so-called 'open loop' condition of stabilized retinal images the direction of a smooth movement is determined by the size of the extrafoveal image, the velocity of the smooth movement depends on the magnitude of the image eccentricity, and the direction of the smooth movement changes if the subject shifts his attention to the right or left of a foveally stabilized image. It is shown that real parafoveal visual input is not mandatory for a smooth eye movement response. Attention alone focused in an eccentric visual direction can be as valid as a physical target and can elicit a smooth eye movement. A.B.K.

**A73-36457 \*** Optokinetic stimulation of an immobilized eye in the monkey. F. Kornr (MIT, Cambridge, Mass.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 298-307. 11 refs. NSF Grant No. GB-17047; Grant No. NGL-22-009-308.

Quantitative investigation of the optokinetic nystagmus effect in rhesus monkeys. The results obtained are shown to parallel those found for the rabbit by Ter Braak (1936). Quantitative findings pertaining to the ratio between slow velocity of nystagmus and stimulus speed as a power function of pattern motion velocity and to other parameters are presented graphically and discussed. M.V.E.

**A73-36458** Ambivalent optokinetic stimulation and motion detection. J. W. G. ter Braak (Rotterdam, Medical Faculty, Rotterdam, Netherlands). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 308-316. 8 refs.

In the experiments described, two stationary, identical pictures were projected alternately on a screen by two slide projectors provided with synchronously-rotating sectored disks. Usually the open sectors alternated with a 180-degree phase difference, but this could be varied. Alternation frequencies varied from 6 to 15 Hz. It was found that optokinetic nystagmus with amplitudes of up to 30 deg can be evoked by repeated displacement of regular and irregular patterns over an angle in the range from 0.5 to 1 deg. G.R.

**A73-36459** Quantitative studies on optokinetic nystagmus in the monkey. P. Pasik, T. Pasik, and J. A. Valciukas (Mount Sinai School of Medicine, New York, N.Y.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 317-326. 13 refs. Grants No. PHS-MH-02261; No. PHS-K3-EY-16865.

Relationships found between stimulus and response frequencies are reported together with threshold determinations for horizontal optokinetic nystagmus. The frequency function of optokinetic nystagmus is considered along with questions of optokinetic frequency and luminance thresholds. The results of psychophysical determinations suggest that once an absolute luminance threshold is exceeded, the lower frequency thresholds reflect merely the presence or absence of the moving stimulus. G.R.

**A73-36460** Visual-vestibular interaction and motion perception. J. Dichgans and T. Brandt (Freiburg, Universität, Freiburg im Breisgau, West Germany). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 327-338. 15 refs. Research supported by the Deutsche Forschungsgemeinschaft and Fraunhofer Gesellschaft.

The characteristics of the visually-induced perception of self-rotation are described together with a visually-induced pseudo-Coriolis effect. The observations considered strongly suggest that visual information about the motion of the surroundings of a person may be evaluated by central nervous structures that normally process vestibular input. Experiments with animals were undertaken to demonstrate physiologically that the postulated convergence onto vestibular structures does in fact take place. It is shown that during saccadic eye movements the vestibular systems is also under the control of a collateral oculomotor output. G.R.

**A73-36461** Eye movements necessary for continuous perception during stabilization of retinal images. H. J. M. Gerrits and A. J. H. Vendrik (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 339-347. 13 refs.

**A73-36462** Eye movements and space perception. E. R. Wist (Franklin and Marshall College, Lancaster, Pa.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 348-357. 12 refs. Research supported by the Franklin and Marshall College; Grant No. NIH-EY-00286-06.

The role of convergence as a possible mediator of perceptions of egocentric distance is considered. Various candidates for mediating the perception of egocentric distance exist such as texture gradients and perspective. In the cue isolation experiment the attempt is made to eliminate all visual cues to egocentric distance leaving only convergence. In the cue conflict experiment convergence information is modified so that it is in conflict with distance information from other cues. The studies reported include an experiment in which the effects of base magnification on the perception of perceived absolute size and distance were investigated. G.R.

**A73-36463** Visual perception of direction and voluntary saccadic eye movements. L. Marin and E. Marin (Columbia University, New York, N.Y.). In: Cerebral control of eye movements and motion perception; Proceedings of the Symposium, Freiburg im Breisgau, West Germany, July 20-22, 1971. Basel, S. Karger AG (Bibliotheca Ophthalmologica, No. 82), 1972, p. 358-368. 13 refs. NSF Grant No. GB-5947; Grant No. NIH-RO1-5-EY-00375.

**A73-36503 \*** Purification of *Synechococcus lividus* by equilibrium centrifugation and its synchronization by differential centrifugation. T. O. Sitz and R. R. Schmidt (Virginia Polytechnic Institute and State University, Blacksburg, Va.). *Journal of Bacteriology*, vol. 115, July 1973, p. 43-46. 16 refs. NSF Grant No. GB-17305; Grant No. NGR-47-004-006.

**A73-36516** Advances in electrocardiography; Proceedings of the Symposium, Emory University, Atlanta, Ga., May 10-13, 1971. Symposium sponsored by Emory University. Edited by R. C. Schlant and J. W. Hurst (Emory University, Atlanta, Ga.). New York, Grune and Stratton, Inc. (Cardiovascular Diseases: Current Status and Advances. Volume 1), 1972. 465 p. \$24.75.

Limitations of the dipole concept in electrocardiographic interpretation, trends in electrocardiographic recording, and clinical comparisons of isopotential surface maps are among the topics

covered in papers concerned with the general electrophysiology of the heart. Other areas covered include the pathophysiology of conduction and of abnormal cardiac rhythms, preexcitation and the Wolff-Parkinson-White syndrome, and miscellaneous effects upon the electrocardiogram.

M.V.E.

**A73-36517** Limitations of the dipole concept in electrocardiographic interpretation. L. G. Horan and N. C. Flowers (U.S. Veterans Administration Hospital; Georgia, Medical College, Augusta, Ga.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 9-18. 19 refs. Research supported by the American Heart Association; Grant No. PHS-HE-11667.

It is shown that the heart behaves electrically as a more complex source than a dipole. If there is more information available than is currently used, it is due to the limited ability of the instruments and minds to handle that information. Following a review of the dipole hypothesis, areas of inquiry are pointed out where it should be possible to obtain useful additional information. Some of the additional information is contrasted with the dipole package, and ways are suggested for making use of such information. M.V.E.

**A73-36518** Intracellular-extracellular action potentials - Considerations for the formation of waveforms and their detection on the body surface. M. S. Spach and R. C. Barr (Duke University, Durham, N.C.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 19-26. 12 refs. Grants No. PHS-11307; No. PHS-5372; No. PHS-5716.

**A73-36519** Physiologic correlates and clinical comparisons of isopotential surface maps with other electrocardiographic methods. R. C. Barr and M. S. Spach (Duke University, Durham, N.C.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 27-36. 10 refs. Grants No. PHS-11307; No. PHS-5372; No. PHS-5716.

**A73-36520** Electrocardiographic diagnosis of sinus node rhythm variations and SA block. R. J. Myerburg (Miami, University; U.S. Veterans Administration Hospital, Miami, Fla.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 73-80. 14 refs.

Variants of normal sinus rhythm are discussed, and variations in the rate of sinus impulse formation are reviewed. Special attention is given to failure of impulse formation and sinoatrial block. In particular, the group of electrocardiographic abnormalities the sinoatrial block constitutes are examined in detail. M.V.E.

**A73-36521** QRS abnormalities in AV block - Variations and their significance. L. Sherf and T. N. James (Alabama, University, Birmingham, Ala.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 81-103. 63 refs. Grants No. PHS-HE-11310; No. PHS-PH-43-67-1441.

An analysis of the QRS pattern during complete atrioventricular block is presented for patients in whom conducted sinus beats have also been observed. By comparing the two resulting QRS patterns, an attempt is made to provide better criteria for the topographic location of the ectopic pacemaker. M.V.E.

**A73-36522** Identification of the sites of atrioventricular conduction defects by means of His bundle electrography and atrial pacing. R. A. Massumi, D. Lee, G. Ertem, and Z. Vera (George

Washington University; District of Columbia General Hospital, Washington, D.C.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.*

New York, Grune and Stratton, Inc., 1972, p. 105-128. 27 refs. Research supported by the American Heart Association.

**A73-36523** The differential electrocardiographic manifestations of hemiblocks, bilateral bundle branch block, and trifascicular blocks. M. B. Rosenbaum, M. V. Elizari, J. O. Lazzari, G. J. Nau, M. S. Halpern, and R. J. Levi (Hospital Salaberry; Hospital Argerich, Buenos Aires, Argentina). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 145-182. 47 refs.

**A73-36524** The clinical causes and mechanisms of intraventricular conduction disturbances. M. B. Rosenbaum, M. V. Elizari, J. O. Lazzari, A. Kretz, and H. O. Da Ruos (Hospital Salaberry; Hospital Argerich, Buenos Aires, Argentina). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 183-220. 63 refs.

Review of some of the mechanisms of intraventricular block, and discussion of their relation to the level of the conduction system at which they exert their maximal effects. Three different levels of the conduction system are considered, and the disease varieties related to each of these levels are examined. M.V.E.

**A73-36525** Intra-atrial and esophageal electrography in the diagnosis of complex arrhythmias. R. A. Massumi and C. J. Desando (George Washington University; District of Columbia General Hospital, Washington, D.C.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 229-248. 22 refs.

Discussion of some technical points of considerable importance to the interpretation of both surface and intracavitary electrographic recordings, with special attention to their limitations. These technical points include the problem of the indistinct or invisible P wave, the dilemma of P-wave polarity, retrograde conduction time and patterns of VA conduction, and right and left atrial potential in atrial flutter. M.V.E.

**A73-36526** Current status of correlations between vectorcardiogram and hemodynamic data. A. C. Witham (Georgia, Medical College, Augusta, Ga.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 309-320. 31 refs.

The current status of electrovectorcardiographic measurements in seven disease states is reviewed. Correlations are shown to be higher when the lesion is congenital or acquired early in life. Confidence remains only in assessing right ventricular pressure in patients with uncomplicated atrial septal defect and pulmonic stenosis, but even here the method is limited by the exclusion of many patients with factors known to cause unreliability. In spite of disappointments, vectorcardiography still seems to have a definite but circumscribed role. M.V.E.

**A73-36527** Diagnostic power of the Q wave - Critical assay of its significance in both detection and localization of myocardial deficit. L. G. Horan and N. C. Flowers (U.S. Veterans Administration Hospital; Georgia, Medical College, Augusta, Ga.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 321-330. 8 refs. Research supported by the American Heart Association; Grant No. PHS-HE-11667.

**A73-36528** Mid- and late changes in the QRS complex. N. C. Flowers and L. G. Horan (U.S. Veterans Administration Hospital; Georgia, Medical College, Augusta, Ga.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 331-348. 37 refs. Research supported by the American Heart Association; Grant No. PHS-HE-11667.

The findings of fresh dissections of the heart in 1411 cases of male cardiac patients who expired at a VA hospital between 1961 and 1967 were correlated with the ECG obtained the nearest to the time of death in an investigation of the significance of mid and late QRS changes. A detailed analysis of the data obtained is presented in tables and graphs. M.V.E.

**A73-36529** The pathogenesis and clinical significance of primary T-wave abnormalities. B. Surawicz (Kentucky, University, Lexington, Ky.). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 377-421. 255 refs.

**A73-36530** Central nervous system influence upon electrocardiographic waveforms. J. A. Abildskov (Utah, University, Salt Lake City, Utah). In: *Advances in electrocardiography; Proceedings of the Symposium, Atlanta, Ga., May 10-13, 1971.* New York, Grune and Stratton, Inc., 1972, p. 423-429. 18 refs. Grant No. PHS-HE-13480.

Summary of some of the published observations and studies which concern neurogenic influences on the electrocardiographic waveform. In particular, early observations and some of the most informative recent studies are reviewed. An enumeration of areas in which additional observations and studies are needed is also presented. M.V.E.

**A73-36531** Atherosclerosis and coronary heart disease. Edited by W. Likoff, B. L. Segal (Hahnemann Medical College and Hospital, Philadelphia, Pa.), W. Insull, Jr. (Cornell University, New York, N.Y.), and J. H. Moyer (Hahnemann Medical College and Hospital, Philadelphia, Pa.). New York, Grune and Stratton, Inc., 1972. 547 p. \$29.75.

Thrombosis in the development of coronary atherosclerosis, localizing factors in arteriosclerosis, and lipids in arteriosclerotic arterial tissues of man are among the topics covered in papers concerned with the pathogenesis of atherosclerosis and coronary heart disease. Other areas covered include the diagnosis, treatment, and prognosis of angina pectoris and myocardial infarction. M.V.E.

**A73-36532** Hereditary aspects of coronary atherosclerosis. C. M. Bloor (California, University, La Jolla, Calif.). In: *Atherosclerosis and coronary heart disease.* New York, Grune and Stratton, Inc., 1972, p. 1-7. 33 refs.

Discussion of the genetics involved in the familial aggregation of disease cases indicated by published family studies focusing on clinical coronary artery disease. The various factors involved in the genesis of coronary atherosclerosis are shown to be subject to polygenic determinism, and it is felt that the occurrence of coronary artery disease in man is unlikely to conform to some Mendelian pattern. M.V.E.

**A73-36533** Plasma lipids and atherosclerosis. P. T. Kuo (Robinette Foundation for Cardiovascular Research; Pennsylvania, University, Hospital, Philadelphia, Pa.). In: *Atherosclerosis and coronary heart disease.* New York, Grune and Stratton, Inc., 1972, p. 8-19. 37 refs. Grants No. NIH-HE-08805; No. NIH-HE-06352; No. NIH-5-M01-RR-00040-11.

Discussion of the segregation of hypercholesterolemic patients into different categories of metabolic and biochemical abnormalities for appropriate individualized therapy. Methods recently proposed for sharper separation of several distinct types of elevation in serum

cholesterol and other plasma lipid are described, along with attempts to utilize this information for devising appropriate therapy for each abnormality. Special attention is given to those types of elevation in serum cholesterol which are known to be closely associated with coronary heart disease. M.V.E.

**A73-36534** Lipids in arteriosclerotic arterial tissues of man. W. Insull, Jr. (Cornell University, New York, N.Y.). In: *Atherosclerosis and coronary heart disease.* New York, Grune and Stratton, Inc., 1972, p. 20-27. 24 refs. Research supported by the Zucky Katz Heart Foundation and Ayerst Laboratories; Grants No. PHS-HE-6304; No. PHS-GMT-1-17; No. PHS-GM-12302; No. PHS-HE-13232.

Discussion of the role of lipids in the pathogenesis of arteriosclerosis. Differences are shown to exist in the severity of arteriosclerosis within the arterial system; the gross characteristics of the disease seem to be similar among the coronary, vertebral, and intracranial arteries while differing in significant respects from those in the carotid arteries and the aorta. Some aspects of the role of lipids in these differences are reviewed. M.V.E.

**A73-36535** Cigarette-smoking and coronary atherosclerosis. J. T. Doyle (Union University, Albany, N.Y.). In: *Atherosclerosis and coronary heart disease.* New York, Grune and Stratton, Inc., 1972, p. 35-39. 20 refs.

Discussion of the adverse effect on health, in general, and the relation to coronary heart disease, in particular, of heavy cigarette smoking. Persuasive evidence is shown to exist to the effect that the discontinuance of cigarette smoking lowers the risk of coronary heart disease. Every reasonable effort should be made to convince young people of the folly of taking up cigarette smoking, and to assist the confirmed smoker in ridding himself of an unsanitary, expensive, and unhealthful habit. M.V.E.

**A73-36536** Localizing factors in experimental atherosclerosis. J. T. Flaherty, V. J. Ferrans, J. E. Pierce, T. E. Carew, and D. L. Fry (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.). In: *Atherosclerosis and coronary heart disease.* New York, Grune and Stratton, Inc., 1972, p. 40-83. 32 refs.

Study of the topographic and histologic characteristics of the atherosclerotic process in dogs and miniature swine. Features of induced and spontaneous atherosclerosis in miniature swine are contrasted with those of the induced disease in hypothyroid dogs. The effect of increased blood flow is studied in potentiating atherosclerosis by producing arteriovenous shunts in the femoral and the carotid arteries of dogs. M.V.E.

**A73-36537** Localizing factors in arteriosclerosis. D. L. Fry (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.). In: *Atherosclerosis and coronary heart disease.* New York, Grune and Stratton, Inc., 1972, p. 85-104. 21 refs.

Discussion of the possible mechanisms by which oscillating, high-frequency, and other stress modes, often varying throughout the vascular system, may interact with vessel walls to produce the structural changes observed in arteriosclerotic processes. Also presented are some new physiologic data bearing on the mechanical, structural, and chemical interrelations in the blood-vascular interface which may be of significance for these processes. M.V.E.

**A73-36538** Coronary atherosclerosis and ischemic myocardial damage. I. Gore (Alabama, University, Birmingham, Ala.). In: *Atherosclerosis and coronary heart disease.* New York, Grune and Stratton, Inc., 1972, p. 105-112. 47 refs.

**A73-36539** Factors influencing coronary blood flow in the presence of coronary obstructive disease. D. E. Gregg (U.S. Army, Walter Reed Army Medical Center, Washington, D.C.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 140-145. 9 refs.

**A73-36540** Experimental myocardial infarction - Hemodynamic evaluation. H. J. Gorfinkel, J. P. Szidon, and A. P. Fishman (Pennsylvania, University, Hospital, Philadelphia, Pa.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 200-206. 26 refs.

**A73-36541** Problems in the recognition of angina pectoris. M. T. McDonough, S. Yazdanfar, and J. F. Spann, Jr. (Temple University, Philadelphia, Pa.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 238-242. 6 refs.

Review of some uncommon or spurious syndromes that make it difficult or even impossible for the physician to be certain in the clinical recognition of angina pectoris. The usually 'underdiagnosed' patients with coronary artery disease but unusual angina (Prinzmetal or second-wind angina) are discussed, along with the 'overdiagnosed' patients without coronary artery disease but with noncardiac causes of chest pain, such as psychoneurotic states, musculoskeletal abnormalities, or gastrointestinal problems. M.V.E.

**A73-36542** Electrocardiographic alterations in the presence of angina pectoris. L. S. Dreifus, Y. Watanabe, and A. Hermosillo (Hahnemann Medical College and Hospital, Philadelphia, Pa.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 243-252. 18 refs.

Some common patterns observed in the presence of angina pectoris are identified. Differentiation between normal patterns and those with paradoxical responses are discussed. Pertinent points relating to the electrocardiographic demonstration of changes associated with angina pectoris are pointed out. M.V.E.

**A73-36543** Clinical manifestations of acute myocardial infarction. J. H. Manchester, J. C. Shelburne, and A. P. Fishman (Pennsylvania, University, Hospital, Philadelphia, Pa.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 333-343. 39 refs. Grant No. NIH-HE-8805.

Consideration of several clinical aspects of acute myocardial infarction and of its frequent complications. Heart failure, shock, pericarditis, papillary muscle dysfunction and rupture, septal perforation, cardiac rupture, and cardiac arrhythmias are discussed. M.V.E.

**A73-36544** Electrocardiographic diagnosis of myocardial infarction - Pitfalls of a graphic technique. C. Fisch (Indiana University; Marion County General Hospital, Indianapolis, Ind.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 344-355. 42 refs. Research supported by the Herman C. Krannert Fund, Indiana Heart Association, and American Medical Association; Grants No. PHS-HE-6308; No. PHS-HTS-5363; No. PHS-HE-5749.

Some pitfalls in the electrocardiographic (ECG) diagnosis of myocardial infarction (MI) due to arteriosclerotic coronary artery disease are brought into focus. It is shown that the ECG may fail to reveal the characteristic features of MI or it may present classic ECG features of MI in the absence of MI. 'Atypical' or misleading ECG changes in cases of acute myocardial infarction are reviewed. They include: (1) failure to register any changes during the acute episode, (2) T wave changes only, (3) S-T changes of subendocardial infarction, (4) transient Q waves, (5) QRS changes other than a significant Q wave, and (6) masking of MI by a Wolff-Parkinson-White syndrome or by a left bundle branch block. M.V.E.

**A73-36545** Factors related to maintenance of cell viability. N. Brachfeld (Cornell University; Institute for Muscle Disease, New York, N.Y.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 388-403. 43 refs. Research supported by the New York Heart Association and Muscular Dystrophy Association of America; Grants No. NIH-PH-43-67-1439; No. NIH-HE-06216.

Therapy designed to prevent or diminish the severity of a pathologic process requires control observations that will permit an evaluation of the response of the cell, tissue, or organ being studied. The histological, histochemical, and biochemical phenomena that occur when the cell is challenged by an ischemic insult are briefly reviewed. The theme is the maintenance of cell viability in acute myocardial infarction; therefore major attention is given to myocardial ischemia, although many changes described are nonspecific and occur as well in response to other types of cellular trauma. An attempt is made to indicate those factors in the myocardial cellular environment that support viability, help to maintain cellular homeostasis, and to suggest promising areas for future investigation into the pathogenesis of myocardial infarction and into improved methods of treatment. F.R.L.

**A73-36546** Drug therapy of power failure. A. S. Leon (Newark Beth Israel Medical Center, Newark, N.J.) and W. B. Abrams (New Jersey College of Medicine and Dentistry, Newark, N.J.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 431-443. 89 refs.

Discussion of nonsurgical supportive measures and specific drugs used in the treatment of cardiogenic shock. Among the supportive measures discussed are the use of morphine or other opiates for the relief of pain and anxiety, the use of the fluid-challenge technique to counter depletion of plasma volume, and measures to raise arterial oxygen tension and to reduce acidosis. The therapeutic agents discussed include sympathomimetic amines such as norepinephrine and metaraminol (the most widely used such agents), both of which have combined alpha- and beta-adrenergic effects, and also mephentermine, dopamine, levodopa, and isoproterenol. The use of other inotropic agents such as digitalis and glucagon is then considered, as well as the use of alpha-adrenergic blocking agents and a combination of a sympathomimetic and an alpha-adrenergic blocking agent. A.B.K.

**A73-36547** Power failure of the heart in acute myocardial infarction. H. J. C. Swan (Cedars-Sinai Medical Center; California, University, Los Angeles, Calif.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 453-467. 20 refs.

Microscopic and macroscopic changes in the heart associated with power failure are considered together with a two-component model of the heart as a functioning pump in myocardial infarction, the changes in measurable cardiac function as they relate to clinical findings in myocardial infarction, and the influence of relative hypovolemic or hypervolemic states. The influence of inotropic drugs is also discussed along with the application of newer technologic advances, giving attention to mechanical circulatory assist devices and aspects of early coronary vascular surgery. G.R.

**A73-36548** Evaluation, diagnosis and treatment of common structural complications of acute myocardial infarction. L. Scherlis and D. H. Dembo (Maryland, University, Baltimore, Md.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 468-476. 37 refs.

**A73-36549** The prognosis of myocardial infarction. W. Likoff (Hahnemann Medical College and Hospital, Philadelphia, Pa.). In: Atherosclerosis and coronary heart disease. New York, Grune and Stratton, Inc., 1972, p. 520-524. 7 refs.

A discriminate analysis reveals that a number of basic and clinical factors determine the course of the acute illness. The anatomy of the coronary circulation is discussed together with the location and severity of atherosclerosis, the response of the coronary

arterial system to the reduction in internal caliber, the functional capacity of residual myocardium, the electrophysiologic behavior of myocardium, structural complications, associated diseases, and miscellaneous complications. G.R.

**A73-36567 #** Serotonin content variations in the fore-brain during hibernation (Izmeneniia soderzhaniiia serotonina v perednem mozge vo vremia zimnei spichki). N. N. Kudriavtseva (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 531-534. 7 refs. In Russian.

Seasonal variations of the serotonin content were investigated in the hippocampus of *Citellus erythrogenus* animals during wakefulness and hibernation. Serotonin content reached a maximum at hibernation onset in the fall, somewhat decreased during hibernation, and decreased sharply after awakening in the spring. Serotonin contents in the hippocampus were lower in hamsters kept at 3 to 4 C than in control animals kept at room temperature. V.Z.

**A73-36568 #** Involuntary eye movements in the presence and absence of points (Neproizvol'nye dvizheniia glaz pri nalichii i otsutstvii tochek). V. A. Filin and V. F. Ananin (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Meditsinskogo Priborostroeniia, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 547-550. 8 refs. In Russian.

Photoelectronic recording equipment was used to study the involuntary eye movements in eleven subjects with normal vision. Involuntary eye movements were continuously film-recorded in complete darkness and during the appearance of a neon light point whose motions on a dark background were to be followed by the subjects. Representative recording samples and histograms of eye motions are included. V.Z.

**A73-36569 #** Changes in the electrical activity of the brain and in some thermoregulation indices of nonanesthetized male cats during cooling (Izmeneniia elektricheskoi aktivnosti golovnogo mozga i nekotorykh pokazatelei termoregulatsii pri obshchem okhlazhdenii nenarkotizirovannykh kotov). S. N. Tiglieva (Leningradskii Institut Usovershenstvovaniia Vrachel, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 565-570. 15 refs. In Russian.

**A73-36570 #** Mechanism of working hyperemia condition alteration in the forearm muscles of man under increased loads (O mekhanizme izmeneniia rezhima rabochei giperemii myshts predplechia cheloveka pri uvelichenii nagruzki). L. A. Baraz, E. V. Veselova, E. L. Meshcherskii, and V. M. Khaiutin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 578-583. 15 refs. In Russian.

**A73-36571 #** Effect of sympatholytin on metabolism in resting and working muscles in relation to the degree of their adaptation to intensified activity (Vliianie simpatolitina na obmen veshchestv v pokoiashchikh i rabotaiushchikh myshtsakh v zavisimosti ot stepeni adaptatsii ikh k povyshennoi deiatel'nosti). N. N. Iakovlev, A. F. Krasnova, R. I. Lenkova, and L. V. Maksimova (Leningradskii Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 584-589. 17 refs. In Russian.

**A73-36572 #** The role of the elastic properties of brain and spine cavities in hyperemia compensation (Rol' elasticheskikh svoistv polostei cherepa i pozvonochnika v kompensatsii krovenapolneniia). Iu. Ia. Kisliakov and B. B. Zelikson (Akademiia Nauk SSSR, Institut Evolutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 606-612. 17 refs. In Russian.

Experiments on live cats and cat corpses immediately after slaughter show that the hyperemia compensation capacity of the spine cavity is 1.5 to 2 times that of the brain cavity. The combined

compensation capacity of both cavities is roughly by a factor of 1.5 lower than that of the cardiovascular system when the liquid pressure is low and approaches that of the cardiovascular system when the liquid pressure is high. V.Z.

**A73-36573 #** Asana and breathing (Asana i dykhanie). I. P. Blokhin and T. M. Shanmugam (Leningradskii Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 632-638. 14 refs. In Russian.

Respiration volume and rates, pulmonary ventilation, lung volume, oxygen uptake, and inhalation and exhalation volumes were measured in a group of 28 highly proficient athletes during the execution of asana exercises - a system of gymnastics practiced by yogis. The well-pronounced postural effects on the ventilation capacity and lung volume mobility along with relatively low energy expenditure are established in the subjects during asana practicing. V.Z.

**A73-36574 #** Techniques for microinjection of biologically active substances into subcortical structures of the brain (Metodika mikroin'ektsii biologicheskii aktivnykh veshchestv v podkorkovye struktury mozga). K. I. Nesen (Institut Endokrinologii i Obmena Veshchestv, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 661-663. 5 refs. In Russian.

**A73-36575 #** Angiotensiotonography using an air plethysmograph (Angiotenzionografiia s ispol'zovaniem vozdushnogo pletizmograf). M. M. Speranskii (Leningradskii Nauchno-Issledovatel'skii Institut Gigeny Truda i Professional'nykh Zabolovani, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 665-668. 6 refs. In Russian.

Description of an assembly comprising an electric circuit and a pneumatic system for recording arterial inflow volume rates by a volumetric plethysmographic bloodless-occlusion technique, along with angiotensiotonograms and artery oscillograms. The performance characteristics of the assembly are discussed and its advantages over other techniques are indicated. V.Z.

**A73-36576 #** Techniques for studying the aerodynamic characteristics of the bronchial tree of man (Metodika issledovaniia aerodinamicheskikh kharakteristik bronkhial'nogo dereva cheloveka). E. I. Al'tman and P. G. Men' (Klinika Legochnoi Khirurgii; Nauchno-Issledovatel'skii Institut Tuberkuleza; Ural'skii Politekhnikheskii Institut, Sverdlovsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Apr. 1973, p. 668-670. In Russian.

Description of experiments in the measurement of air and water flow drag in human bronchial tree preparations. Directions are given as to how the measurement procedure should be conducted for determining the flow distribution in the bronchial tree, the passability of bronchial vs aerodynamic drag, and the dependence of bronchial drag on the geometric parameters of the bronchial tree. V.Z.

**A73-36577 #** Determination of the type of higher nervous activity from the aftereffect characteristics of multidimensional stimuli (Viznachennia tipu vishchoi nervovoi diial'nosti za pokaznikami pisladii bagatomirnogo podraznika). L. V. Volkov and T. Iu. Moiseeva (Kiiiv'skii Institut Fizichnoi Kul'turi, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal*, vol. 19, May-June 1973, p. 297-302. 7 refs. In Ukrainian.

**A73-36578 #** Role of arterial and venous vessels of limbs in the process of cardiovascular reflex responses (Rol' arterial'nykh i venoznykh sudin kintsivok v perebigu reflektornikh sertsevo-

**sudinnikh reaktsii).** V. V. Bratus' and L. I. Novichenko (Akademiia Nauk Ukrain'skoi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 19, May-June 1973, p. 315-320. 11 refs. In Ukrainian.

Investigation of the possibility of selective central influences upon specific vascular regions, and assessment of the participation of the arterial and venous branches of the blood circulation system in the process of reflex responses to stimulation of sensitive tibial nerve fibers. The absence of significant changes in the tonus of hind-leg resistive vessels during the process of reflex responses to stimulation of sensitive tibial nerve fibers suggests no major participation of the limb vessels in the hemodynamic pattern alterations underlying the investigated reflex response process of the blood circulation system. M.V.E.

**A73-36579 #** Specific features in the activity of the oxygen transport system of the organism during hand-performed working cycles of submaximum intensity (Osoblivosti diial'nosti kisen'-transportnoi sistemi organizmu pri tsiklichnii roboti submaksimal'noi intensivnosti, vikonuvanoi rukami). V. S. Mishchenko (Kiiivs'kii Derzhavnii Universitet, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 19, May-June 1973, p. 333-340. 33 refs. In Ukrainian.

**A73-36580 #** Changes in respiration effectiveness during muscular activity (Pro zminu efektivnosti diikhannia pri m'iazovii diial'nosti). V. A. Antikova (Kiiivs'kii Institut Fizichnoi Kul'turi, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 19, May-June 1973, p. 341-349. 39 refs. In Ukrainian.

External respiration effectiveness variations in swimmer athletes under cyclic-type (ergometer-bicycle ride) loads are examined with respect to their role in supplying working muscle tissues with oxygen. The interrelation of these variations with the working capacity of the athletes is also investigated. It is found that, during muscular activity of a cyclic type, the external respiration effectiveness varies as a function of physical load intensity. Under cyclic-type physical loads, degradation in respiration effectiveness and economy occurs considerably later in athletes of outstanding working capacity than in ordinary people. M.V.E.

**A73-36581 #** The effects of training on some parameters of hemodynamics and of the oxygen transportation function of the blood during static strains (Vpliv trenuvannia na deiakii pokazniki gemodinamiki ta kisen'-transportnoi funktsii krovi pri statichnikh zushliakh). Iu. V. Stepanov (Akademiia Nauk Ukrain'skoi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 19, May-June 1973, p. 350-356. 31 refs. In Ukrainian.

Review of the minute blood volume, the oxygen transportation characteristics of the arterial and venous blood, and the quantitative correlation between the blood-carried oxygen and the oxygen consumption of tissues measured in men of various levels of training. It is shown that training improves the effectiveness of blood circulation in regard to oxygen supply to tissues during static exertions. M.V.E.

**A73-36582 #** Activity variations of some renal enzymes during stepwise increased hypoxia (Zmini aktivnosti deiakikh fermentiv nirki pri stupinchastii gipoksii). M. V. Karzov (Zaporiz'kii Medichnii Institut, Zaporozhe, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 19, May-June 1973, p. 373-378. 18 refs. In Ukrainian.

Phosphorylase, dehydrogenase, and NAD-diaphorase enzyme systems were studied in the kidney tissue of 39 rabbits exposed to a hypoxia increased by 1000-m steps from an equivalent altitude of 2000 m to that of 9000 m with a 4-day plateau at each step, as well as of rabbits succumbed to acute hypoxia within 20 min. From the results obtained, the directions of the adaptive metabolic shifts in the cortical and medullary kidney substances are inferred. M.V.E.

**A73-36583 #** Temperature of exhaled air of healthy subjects (Temperatura vidikhuvanogo povitria zdorovikh liudei). I. I. Doroshenko (Vinnits'kii Medichnii Institut, Vinnitsa, Ukrainian SSR).

*Fiziologichnii Zhurnal*, vol. 19, May-June 1973, p. 408-410. 12 refs. In Ukrainian.

The temperature of exhaled air in man was investigated using 330 healthy subjects of both sexes and of differing age in a room-temperature (20 to 24 C) environment of a relative humidity of 50 to 60%. The temperature of the exhaled alveolar air of practically healthy individuals suffering frequent respiratory disorders due to common colds was reliably found to be lower, and the difference between body and exhaled-air temperatures wider, than those of healthy subjects not or less susceptible to common colds. M.V.E.

**A73-36651** Gas mixing during breath holding studied by intrapulmonary gas sampling. L. A. Engel, H. Menkes, L. D. H. Wood, G. Utz, J. Joubert, and P. T. Macklem (Royal Victoria Hospital, Montreal, Canada). *Journal of Applied Physiology*, vol. 35, July 1973, p. 9-17. 17 refs. Research supported by the Defence Research Board of Canada.

A new method of sampling gases from intrapulmonary airways has been used to study mixing between dead space and alveolar gas during breath holding in anesthetized, open-chested dogs. Following an inspiration of O<sub>2</sub>, N<sub>2</sub> was detected in airways 2.5 to 16 mm in diameter within 1 sec of breath holding. After 10 sec, all airways contained N<sub>2</sub> in excess of 50% of alveolar concentrations. N<sub>2</sub> tracings from all airways showed cardiogenic oscillations resulting in a stepwise increase in N<sub>2</sub>. Gas mixing due to molecular diffusion was studied in lungs after death. The time to reach 50% of alveolar concentrations was approximately five times shorter in vivo than postmortem. This difference is attributed to the dynamic component of gas mixing consequent upon cardiac action. It is responsible for about one-fourth of the reduction in dead space during the first 10 seconds of breath holding. (Author)

**A73-36652** Gas mixing during inspiration. L. A. Engel, L. D. H. Wood, G. Utz, and P. T. Macklem (Royal Victoria Hospital, Montreal, Canada). *Journal of Applied Physiology*, vol. 35, July 1973, p. 18-24. 15 refs. Research supported by the Defence Research Board of Canada.

The FN<sub>2</sub> within airways 3 to 19 mm in diameter was measured during inflation with O<sub>2</sub>. In 23 of 34 airways sampled in anesthetized, open-chested dogs N<sub>2</sub> oscillations having the frequency of the heartbeat were recorded during inflation to 70% VC at a constant flow rate. The peaks of the oscillations ranged up to 52% of postinflation alveolar concentrations and in some cases the basal FN<sub>2</sub> between peaks remained above zero throughout inflation. The presence of alveolar gas within conducting airways was greater at higher lung volumes and lower inspiratory flows. It was not a consequence of the flow pattern through the bronchial tree, since during inflation with O<sub>2</sub> after death FN<sub>2</sub> in the airways always fell to zero. The findings are explained using a model based on molecular diffusion to which is added a cardiogenic dynamic component that enhances gas mixing and extends the boundary between inspired and alveolar gas into the larger airways. (Author)

**A73-36653** Protein synthesis in lung - Recovery from exposure to hyperoxia. D. Massaro (U.S. Veterans Administration; George Washington University Medical Center, Washington, D.C.). *Journal of Applied Physiology*, vol. 35, July 1973, p. 32-34. 19 refs. Research supported by the American Thoracic Society and John A. Hartford Foundation.

Measurement of the incorporation of leucine-C-14 into protein by rat lungs during 24 hr of room air breathing immediately following 48 hr exposure to hyperoxia or compressed air. It is shown that 4 hr of room air breathing is not sufficient for recovery from 48 hr of hyperoxia. However, after 24 hr of room air breathing leucine-C-14 incorporation into total protein is 1.9 times greater in rats previously exposed to hyperoxia than in control rats and incorporation into protein of the surface-active fraction is 1.5 times greater than in control rats. A.B.K.

**A73-36654 \*** Red cell volume with changes in plasma osmolality during maximal exercise. W. van Beaumont (St. Louis University, St. Louis, Mo.). *Journal of Applied Physiology*, vol. 35, July 1973, p. 47-50. 26 refs. Grant No. NGR-26-006-039.

The volume of the red cell in vivo was measured during acute changes in plasma osmolality evoked through short (6 to 8 min) maximal exercise in six male volunteer subjects. Simultaneous measurements of mean corpuscular red cell volume (MCV), hematocrit, blood hemoglobin, mean corpuscular hemoglobin concentration (MCHC), and plasma osmolality showed that there was no change in the MCV or MCHC with a concomitant rise of nearly 6% in plasma osmolality. Apparently, in vivo, the volume of the red cell in exercising healthy human subjects does not change measurably, in spite of significant changes in osmotic pressure of the surrounding medium. Consequently, it is not justified to correct postexercise hematocrit measurements for changes in plasma osmolality. (Author)

**A73-36655** Energy supply in acute cold-exposed dogs. Y. Minaire, J.-C. Vincent-Falquet, A. Pernod, and J. Chatonnet (CNRS, Laboratoire de Thermorégulation, Lyons, France). *Journal of Applied Physiology*, vol. 35, July 1973, p. 51-57. 30 refs.

Evaluation of the importance of various substrates for energy supply during acute cold exposure of dogs. Experiments were performed on dogs exposed to different ambient temperatures in order to obtain a large range of metabolic rates (from one to eight times the basic metabolic rate). Glucose-U-C-14 and palmitic acid-I-C-14, used as tracers according to the primed constant-infusion technique, allowed estimation of the mobilization and utilization of the extramuscular fuels. During experiments with glucose-U-C-14 at the highest energy expenditure level, measurements of plasma lactate specific activity allowed estimation of the breakdown and oxidation of muscular glycogen. A.B.K.

**A73-36656** Cardiorespiratory transients in exercising man. I - Tests of superposition. II - Linear models. Y. Fujihara, J. R. Hildebrandt, and J. Hildebrandt (Virginia Mason Research Center, Seattle, Wash.). *Journal of Applied Physiology*, vol. 35, July 1973, p. 58-76. 65 refs. Grant No. NIH-HL-13233.

Study of cardiac and respiratory responses to impulse, step, and ramp waveforms of work obtained from five subjects. Certain similarities between the transfer functions for heart rate and minute ventilation were found. Each contains two distinct low-pass filtering terms, the first having a time delay of only a few seconds or less, and the second a time delay of about 17 sec. This would be consistent with the concept that exercise stimuli consisted of both neural and humoral components. A fairly rapid initial component in the ventilatory response to impulse work accounted for about one-sixth of the total increment and might be considered equivalent to a neural factor. The major portion of the ventilatory change was more gradual and occurred after a time delay of close to 20 sec. It is likely that this represents the humoral component. Heart rate responded almost immediately, with only one major accelerative component, suggesting primarily neural control. A.B.K.

**A73-36657 \*** Control of forearm skin blood flow during periods of steadily increasing skin temperature. G. L. Brengelmann, C. Wyss, and L. B. Rowell (Washington University, Seattle, Wash.). *Journal of Applied Physiology*, vol. 35, July 1973, p. 77-84. 34 refs. Grants No. NGR-48-002-082; No. NIH-RR-37.

**A73-36658** Adequacy of the Haldane transformation in the computation of exercise oxygen consumption in man. J. H. Wilmore (California University, Davis, Calif.) and D. L. Costill (Ball State University, Muncie, Ind.). *Journal of Applied Physiology*, vol. 35, July 1973, p. 85-89. 12 refs.

This study attempted to determine the extent, if any, to which nitrogen retention-production influences the calculation of oxygen consumption via the Haldane transformation during graded exercise. Six subjects exercised from 2 to 4 hr after their last meal at speeds of

4.0, 6.0, and 7.5 mph (6.4, 9.7, and 12.1 km/hr) on a motor-driven treadmill. Nitrogen retention of an undetermined nature was found in three of the six subjects, but this amounted to less than 0.8% of the total volume of nitrogen inspired. This nitrogen retention, whether of a real or artifactual nature, had no significant influence on the subsequent calculation of oxygen consumption. (Author)

**A73-36659** Influence of carbon monoxide and of hemodilution on cerebral blood flow and blood gases in man. O. B. Paulson, H.-H. Parving, J. Olesen, and E. Skinhoj (Bispebjerg Hospital; Rigshospitalet, Copenhagen, Denmark). *Journal of Applied Physiology*, vol. 35, July 1973, p. 111-116. 23 refs. Research supported by the Council for Tobacco Research.

Comparison of the influence of moderate carbon monoxide exposure and hemodilution on a number of cerebral blood flow (CBF) parameters. A significant CBF increase was observed at a carboxyhemoglobin concentration of only 20%. It is demonstrated that the CBF increase was more marked during carbon monoxide exposure than during hemodilution and that this difference was probably due to the shift to the left of the oxyhemoglobin dissociation curve during carbon monoxide exposure. Furthermore, it was observed that the jugular venous oxygen tension decreased during carbon monoxide exposure, whereas it remained constant during hemodilution. A.B.K.

**A73-36660** Steady-state equality of respiratory gaseous N<sub>2</sub> in resting man. E. L. Fox (Ohio State University, Columbus, Ohio) and R. W. Bowers (Bowling Green State University, Bowling Green, Ohio). *Journal of Applied Physiology*, vol. 35, July 1973, p. 143, 144. 10 refs.

Inspired and expired gaseous nitrogen amounts were measured under resting steady-state conditions in five fasted male subjects. Differences between inspired and expired gaseous nitrogen were not consistent. It was concluded that, if N<sub>2</sub> production or retention does take place in resting fasted man, it is too small to be adequately measured via present techniques and/or too variable to be statistically demonstrable. M.V.E.

**A73-36661** Measurement of cardiac output with and organ trapping of radioactive microspheres. J. P. Archie, Jr., D. E. Fixler, D. J. Ulflyot, J. I. E. Hoffman, J. R. Utley, and E. L. Carlson (California University, San Francisco, Calif.). *Journal of Applied Physiology*, vol. 35, July 1973, p. 148-154. 21 refs. Grants No. NIH-HL-6285; No. NIH-T01-GM-01924-03.

A method for measuring cardiac output in dogs and lambs with radioactive microspheres is evaluated, along with a method for measuring the fraction of injected microsphere radioactivity that is not trapped in organs. The significance and limitations of the findings these methods make possible are defined and discussed. M.V.E.

**A73-36662** Human calorimeter with a new type of gradient layer. G. Spinnler, E. Jéquier, R. Favre, M. Dolivo, and A. Vannotti (Lausanne, Université, Lausanne, Switzerland). *Journal of Applied Physiology*, vol. 35, July 1973, p. 158-165. 15 refs. Research supported by the Nestle Co.

A new gradient direct calorimeter for continuous recording of heat losses in man is described. The instrument, as have previous ones, allows partitioning measurements of respiratory and cutaneous heat losses. The gradient layer is made of an epoxy resin layer with printed copper circuits on both sides. The heat flow through the layer is obtained by measurement of the difference in electrical resistance between both circuits mounted in a Wheatstone bridge. The overall response time of the calorimeter is less than 3 min. Equations are presented for the customary corrections of measurements by gradient-layer calorimetry with ventilatory circuit. (Author)

**A73-36780** Sonic booms and sleep - Affect change as a function of age. R. C. Smith and G. L. Hutto (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aerospace Medicine*,



vol. 44, July 1973, Section 1, p. 703-707. 11 refs.

This study concerned the measurement of mood changes resulting from simulated sonic booms occurring during sleep. Subjects from three age groups (21 to 26, 40 to 45, and 60 to 72 years old) spent 21 consecutive nights in a sleeping room equipped for sonic-boom simulation. During the 6th through 17th nights, simulated sonic booms of 1.0 psf 'outdoors' overpressure level (0.1 psf measured inside the sleeping rooms) were presented hourly throughout each night. As the measure of mood, the subjects completed a composite mood adjective check-list in the evening before retiring and in the morning after waking on each of the 21 days. No change in moods attributable to the occurrence of simulated sonic booms was found. Substantial effects relating to the age of subjects, irrespective of boom presentations, were obtained.

(Author)

**A73-36781** Thermographic evaluation of relative heat loss areas of man during cold water immersion. J. S. Hayward, M. Collis, and J. D. Eckerson (Victoria, University, Victoria, British Columbia, Canada). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 708-711. 6 refs.

**A73-36782** Accelerated coagulation of whole blood and cell-free plasma by bubbling in vitro. J. M. Hallenbeck, A. A. Bove, R. B. Moquin, and D. H. Elliott (National Naval Medical Center, Naval Medical Research Institute, Bethesda, Md.). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 712-714. 15 refs. Navy-supported research.

**A73-36783** Intellectual performance during prolonged exposure to noise and mild hypoxia. W. R. Pierson (Lockheed-California Co., Burbank; Southern California, University, Los Angeles, Calif.). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 723, 724. 12 refs.

The purpose of this study was to investigate the effects of 6.5 hr exposure to 85 dB(A) turboprop aircraft noise and an 8,000-ft simulated altitude on intellectual judgments common to aircrew tasks. No significant effects were noted in the ability to recall analogous situations and solutions, the ability to decode series of symbols into meaningful groups, or the ability to perform appropriate sequential psychomotor tasks. There was no apparent synergistic effect on these same variables.

(Author)

**A73-36784** Tolerance to heat following cold stress. E. Shvartz and A. Magazani (Tel Aviv University, Tel Aviv, Israel). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 725-729. 11 refs.

It is shown that tolerance to severe heat is not significantly improved by previous exposure to cold stress when the latter is attended by an increase in rectal temperature. Exposure to mild cold for periods of more than an hour can probably improve subsequent tolerance to heat because such an exposure results in a decrease in core temperature.

M.V.E.

**A73-36785** Thermal comfort - New directions and standards. F. H. Rohles, Jr. and R. G. Nevins (Kansas State University of Agriculture and Applied Science, Manhattan, Kan.). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 730-738. 17 refs. Research supported by the American Society of Heating, Refrigerating, and Air Conditioning Engineers.

In order to determine the range of temperatures at which sedentary humans report feeling comfortable, 1600 young adults were exposed in groups of ten - five men and five women - to 20 dry-bulb temperatures ranging from 60 to 98 F in 2 F increments at each of eight relative humidities, 15 to 85% in 10% increments. The results showed that during the first part of the 3-hr exposure, the men were warmer than the women and that humidity is more important in determining how men feel than how women feel. For further research in the thermal environment a modal comfort

envelope (MCE) consisting of 15 temperature-humidity conditions is proposed and its development, validation, and relationship to the new ASHRAE standards are discussed. The results are presented of a clothing study and an investigation involving elderly subjects in which the MCE was used.

(Author)

**A73-36786** Study of nitrogen balance and creatine and creatinine excretion during recumbency and ambulation of five young adult human males. P. B. Mack and K. B. Montgomery (Texas Woman's University, Denton, Tex.). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 739-746. 50 refs.

**A73-36787** # Human performance at elevated environmental temperatures. W. F. Grether (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 747-755. 48 refs.

A review of research on human performance at elevated temperatures is presented. The findings are analyzed in terms of five categories of performance measurements. Time-estimation studies, requiring subjects to count or tap at specified rates, generally show increased speed of response with elevation of internal body temperature. Most studies of simple reaction time have also resulted in increased speed as either body or environmental temperatures are experimentally increased. Improvements in performance have also been found in measurements of vigilance, with optimum performance appearing at an effective temperature (ET) of about 80 F. For all other performance functions there appears to be a plateau, with only minor effects, up to an ET of about 85 F. As environmental temperatures exceed this value there are generally increasing performance decrements. This plateau up to 85 F ET appears to coincide very closely with the range over which the human body can compensate physiologically to elevated environmental temperatures.

(Author)

**A73-36788** \* Use of the single-breath method of estimating cardiac output during exercise-stress testing. M. C. Buderer, J. A. Rummel, C. F. Sawin (NASA, Johnson Space Center, Environmental Physiology Branch, Houston, Tex.), and D. G. Mauldin (NASA, Johnson Space Center, Environmental Physiology Branch, Houston, Tex.; Technology, Inc., Dayton, Ohio). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 756-760. 10 refs.

The single-breath cardiac output measurement technique of Kim et al. (1966) has been modified for use in obtaining cardiac output measurements during exercise-stress tests on Apollo astronauts. The modifications involve the use of a respiratory mass spectrometer for data acquisition and a digital computer program for data analysis. The variation of the modified method for triplicate steady-state cardiac output measurements was plus or minus 1 liter/min. The combined physiological and methodological variation seen during a set of three exercise tests on a series of subjects was 1 to 2.5 liter/min. Comparison of the modified method with the direct Fick technique showed that although the single-breath values were consistently low, the scatter of data was small and the correlation between the two methods was high. Possible reasons for the low single-breath cardiac output values are discussed.

(Author)

**A73-36789** Prolonged space flight and hypokinesia. V. V. Portugalov and E. I. Il'ina-Kakueva (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 764-768. 7 refs.

The results of functional underloading of the muscular system during a prolonged space flight are studied, taking into account investigations of skeletal antigavity muscles of hypokinetic animals. Possibilities concerning the prevention of unfavorable changes in the muscular system in connection with an extended exposure of animals to hypokinesia are also considered. It is found that various types of

antigravity muscles of rat hindlimbs respond differently to the state of functional underloading. It is concluded that diminished motor activity brings about morphological and cytochemical changes in skeletal muscles. G.R.

**A73-36790 Hypoglycemia in airline pilots.** C. R. Harper (Aviation Insurance Agency, Inc., Atlanta, Ga.) and G. J. Kidera (United Air Lines, Inc., Chicago, Ill.). (*International Congress of Aviation and Space Medicine, 20th, Nice, France, Sept. 18-21, 1972.*) *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 769-771. 20 refs.

Because of the physiological complexities of carbohydrate metabolism, the diagnosis is often difficult to establish clinically. This paper reviews generally the physiology of hypoglycemia and discusses the incidence of chemical and clinical hypoglycemia in a sample of 175 airline pilots over a period of three years. Several cases are presented which were directly related to flight safety. The management of hypoglycemia in airline pilots is discussed and the need for education in the aviation industry is emphasized. (Author)

**A73-36791 Air-transport, a main cause of smallpox epidemics today.** J. O. Hagelsten and K. Jessen (Royal Danish Air Force, Medical Services, Vaerlose Air Base, Denmark). (*International Congress of Aviation and Space Medicine, 20th, Nice, France, Sept. 18-21, 1972.*) *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 772-774. 5 refs.

**A73-36792 Further sleep problems in airline pilots on world-wide schedules.** F. S. Preston (Air Corporations Joint Medical Service, London, England). (*International Congress of Aviation and Space Medicine, 20th, Nice, France, Sept. 18-21, 1972.*) *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 775-782. 18 refs.

This study follows previous work carried out on airline pilots operating long-haul transmeridian routes with particular respect to the sleep patterns obtained at stop stations en route. The author accompanied a B-707 crew on a long transmeridian tour when all members kept careful sleep logs for a period of 1 month and the data obtained show clear evidence of sleep deficit occurring in tours of this nature with some evidence of age variation in individuals. The practical problems in scheduling crews in such operations are discussed in some detail in relation to performance, the use of hypnotics, and difficulties surrounding pilots in bidding for successive tours which may result in sleep deprivation. (Author)

**A73-36793 Physical energy expenditure in long-haul cabin crew.** R. M. Barnes (Air Corporations Joint Medical Service, London, England). *Aerospace Medicine*, vol. 44, July 1973, Section 1, p. 783-785. 6 refs.

A study of the physical energy expenditure of BOAC's cabin crew was carried out as part of a workload survey, using an indirect method of measurement. Due to the variety of duties cabin staff carry out, it was necessary to analyze their working day and break it down into a number of defined tasks. Volunteers were asked to carry out these tasks in the training mock-up while wearing a Max Planck respirometer. From the results obtained, the subjects' energy expenditure per minute was calculated. Experiments were carried out to show that the figures obtained were equally applicable at cabin altitudes. By means of time and motion studies and questioning the cabin crew an 'average working day' and a 'maximum working day' were built up. The energy expenditure was then estimated. This was compared with that of other working groups. It was concluded that the physical energy expenditure of the cabin crew was within acceptable limits. (Author)

**A73-36794 \* Hematological, biochemical, and immunological studies during a 14-day continuous exposure to 5.2% O<sub>2</sub> in N<sub>2</sub> at pressure equivalent to 100 FSW /4 ata/.** W. C. Alexander, C. S. Leach, C. L. Fischer, C. J. Lambertsen, and P. C. Johnson (NASA, Johnson Space Center, Clinical Laboratory; Baylor University,

Houston, Tex.; Pennsylvania, University, Philadelphia, Pa.). *Aerospace Medicine*, vol. 44, July 1973, Section 2, p. 850-854. 29 refs. Contracts No. N00014-67-A-0216-0018; No. N00014-67-A-0216-0021; No. N00014-67-A-0216-0022; Grants No. NIH-HE-08899; No. NGL-39-010-097.

**A73-36795 \* Endocrine studies during a 14-day continuous exposure to 5.2% O<sub>2</sub> in N<sub>2</sub> at pressure equivalent to 100 FSW /4 ata/.** C. S. Leach, W. C. Alexander, C. L. Fischer, C. J. Lambertsen, and P. C. Johnson (NASA, Johnson Space Center, Clinical Laboratory; Baylor University, Houston, Tex.; Pennsylvania, University, Philadelphia, Pa.). *Aerospace Medicine*, vol. 44, July 1973, Section 2, p. 855-859. 19 refs. Contracts No. N00014-67-A-0216-0018; No. N00014-67-A-0216-0021; No. N00014-67-A-0216-0022; Grants No. NIH-HE-08899; No. NGL-39-010-097.

**A73-36796 \* Body fluid volume changes during a 14-day continuous exposure to 5.2% O<sub>2</sub> in N<sub>2</sub> at pressure equivalent to 100 FSW /4 ata/.** P. C. Johnson, T. B. Driscoll, W. C. Alexander, and C. J. Lambertsen (Baylor University; NASA, Johnson Space Center, Clinical Laboratory, Houston, Tex.; Pennsylvania, University, Philadelphia, Pa.). *Aerospace Medicine*, vol. 44, July 1973, Section 2, p. 860-863. 12 refs. Contracts No. N00014-67-A-0216-0018; No. N00014-67-A-0216-0021; No. N00014-67-A-0216-0022; Grants No. NIH-HE-08899; No. NGL-39-010-097.

**A73-36844 A deterministic model of a well trained human operator performing compensatory tracking.** J. A. Planchard, T. Perkins, and J. Barzini (Louisiana State University, Baton Rouge, La.). In: Summer Computer Simulation Conference, Montreal, Canada, July 17-19, 1973, Proceedings. Volume 2.

La Jolla, Calif., Society for Computer Simulation, Inc., 1973, p. 1165-1169. 8 refs.

The performance of a well-trained human operator engaged in a tracking task was analyzed. The device controlled by the operator consisted of a manually powered, nonlinear aiming device with optical feedback used to track a three dimensional target. Mathematical models of the human operator and the aiming device were developed, then used to calculate alignment errors for a variety of target trajectories. Trained operators tracked similar targets with a hybrid simulation of the aiming device. The results of both studies were analyzed indicating that the dual-modal operator model developed was superior to the linear continuous model. In addition, the human model possessed good stability and may be used to predict tracking errors over a wide range of target trajectories. (Author)

**A73-36847 # Sudden incapacitation in flight.** F. H. Zebouni (Middle East Airlines Air Liban, S.A., Beirut, Lebanon). In: Seminar on Accident Analysis and Prevention, Beirut, Lebanon, June 26-28, 1973, Working Documents. Beirut, Civil Aviation Safety Centre, 1973. 16 p.

Aspects of the medical control of pilots are discussed together with the various causes responsible for cases of sudden incapacitation of the pilot. These causes include cases of gastro-intestinal trouble, psychological problems, coronary heart disease, low blood sugar, use of self medication, urinary stone passing, and epilepsy. Approaches for preventing sudden incapacitation are considered. A pilot is to be trained in the procedures to be adopted in case of a sudden incapacitation of the other pilot. Studies in simulations revealed that without education and drill a subtle incapacitation could cause a crash during a critical phase of flight, in over 50% of the cases. G.R.

**A73-36850 # Objectives of training in relation to accident prevention.** G. Saliba (Civil Aviation Safety Centre, Beirut, Leba-

non). In: Seminar on Accident Analysis and Prevention, Beirut, Lebanon, June 26-28, 1973, Working Documents.

Beirut, Civil Aviation Safety Centre, 1973. 9 p.

Many problems of aviation safety can be solved by proper training. The requirements for such a training are considered, giving attention to training motivation, the establishment of programs, the provision of funds for training, and the availability of proper training centers. Refresher training is an important factor in keeping pilots informed with respect to the latest aviation developments. G.R.

**A73-36901** International Congress of Aeronautical and Space Medicine, 20th, Nice, France, September 18-21, 1972, Reports (Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, September 18-21, 1972, Communications). Congress sponsored by the Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques. *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973. 207 p. In French and English.

Topics discussed include statokinetic irritants and statokinetic stability, measurements of the solar proton and galactic background radiations at SST cruising altitudes, the impact of the SST on the environment, the effect of the supersonic boom on the human organism, the analysis of visual evoked potentials, the detection of potential coronary heart disease susceptibility, detection of atherosclerosis in flight personnel, spinal injuries in pilots after emergency ejection, a procedure for weeding out persons unsuitable for parachute jumping, psychic factors in disorientation, pilot performance under complex flight conditions, visual and auditory defects in flight personnel, and studies of the effect of heat, cold water immersion, and exposure to hyper- and hypobaric atmospheres on the human organism.

A.B.K.

**A73-36902** Responsibility for ischemic cardiopathies in civil aviation flight personnel (Responsabilité des cardiopathies ischémiques chez le personnel navigant de l'aviation civile). A. Mathivat (Hôpital Ambroise Paré, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale*, 20th, Nice, France, Sept. 18-21, 1972.) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 16-23. 14 refs. In French.

Review of observations of ischemic cardiopathies due to coronary atherosclerosis among male members of the flight personnel of a commercial airline. These observations are evaluated from the standpoint of the frequency of the malady in comparison to that observed in another male population in every way comparable, the possibility of recovery of patients stricken with myocardial infarction, and the possibility of primary prevention within the framework of aeronautical medicine. The results of a hemodynamic study of myocardial infarction during the acute period, four weeks after the occurrence and four years after the attack are presented, showing the possibility of restoring stricken pilots to normal professional activity. The results of epidemiological investigations are cited, and recommendations are made regarding the systematic detection and quantification of risk factors, the selection of high-risk subjects, and the choice of an effective and reliable treatment. A.B.K.

**A73-36903** The role of the sympathetic section of the vegetative nervous system in the training of the organism for the influence of statokinetic irritants. L. I. Chernikova. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et*

*Spatiale*, 20th, Nice, France, Sept. 18-21, 1972.) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 28-30.

**A73-36904** Statokinetic stability as a component general non-specific resistance. N. A. Razzolov. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale*, 20th, Nice, France, Sept. 18-21, 1972.) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 31, 32.

Results of three series of experiments carried out to test a hypothesis that statokinetic stability depends on the general non-specific resistance of the organism. In the first series the subjects were sorted out by means of double revolving in both the horizontal and sagittal plane into a statokinetically stable and a statokinetically unstable group. In the second series of experiments the altitude resistance of these two groups of subjects was then tested, while in the third series the orthostatic resistance of the subjects was tested. Good resistance to hypoxic and orthostatic stresses was found in persons with high statokinetic stability, while lowered resistance to these stresses was found in statokinetically unstable persons. It is concluded that statokinetic stability is a component of general nonspecific resistance. A.B.K.

**A73-36909** Cardiovascular reactions of a healthy man exposed to sonic booms (Réactions cardiovasculaires de l'homme sain exposé aux bangs soniques). B. Vettes and J. Demange (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale*, 20th, Nice, France, Sept. 18-21, 1972.) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 48-50. 10 refs. In French.

**A73-36910** Effect of sonic boom on hearing and vestibular equilibrium (Effet du bang supersonique sur l'audition et l'équilibre vestibulaire). M. Burgeat, D. Loth, Y. Grall, C. Menguy, and P. Massard (Hôpital Lariboisière, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale*, 20th, Nice, France, Sept. 18-21, 1972.) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 51-53. In French.

**A73-36911** The value of data processing in the analysis of visual evoked potentials (Interet du traitement de l'information dans l'analyse des potentiels évoqués visuels). Y. Grall, M. Burgeat, J. J. Bertrand, C. Menguy, and M. Lecam (Hôpital Lariboisière, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale*, 20th, Nice, France, Sept. 18-21, 1972.) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 54-57. In French.

Description of a program designed to improve previously obtained data concerning visual evoked potentials. After briefly reviewing the procedures used to extract a useful periodic signal from a background noise of amplitude equal to or greater than that of the signal, a three-part program designed to supplement previously obtained data is presented. The first part of this program transforms the data and records them on incremental magnetic tape. The second part takes these recorded data and performs various operations on them, such as addition, subtraction, or merely reading, and makes possible a sequential analysis of partial integrations. The third part performs a calculation of the signal variance. A.B.K.

**A73-36912** The use of simple indicators for detecting potential coronary heart disease susceptibility in the third-class airman population. M. T. Latogola (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 58-62. 16 refs.

**A73-36913** Detection of atherosclerosis in examinations of flight personnel (Dépistage de l'athérosclérose dans l'expertise du personnel navigant). R. Carre, J. Patacq-Crouzet, and F. Plas (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 63-66. In French.

Description of three types of investigation designed to detect the presence of atherosclerosis in medical examinations of flight personnel. The procedures discussed are a clinical examination in search of atherosclerosis complications; a biological checkup involving a determination of total lipids, cholesterol, and triglycerides and an electrophoresis of the lipids; and measurements of arterial distensibility with the aid of the cardiogram. A.B.K.

**A73-36914** Surveillance of the vertebral column in pilots who have undergone an ejection (Surveillance du rachis des pilotes ayant subi une éjection). R. P. Delahaye, P. J. Metges (Hôpital d'Instruction des Armées Bégin, Saint-Mandé, Val-de-Marne, France), and G. Gueffier (Centre Principal d'Expertise du Personnel Navigant, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 67, 68. In French.

**A73-36915** On correlation between the changes in cerebellar bioelectric activity and the adaptive reactions under the effect of accelerations. L. D. Klimovskaia. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 69, 70. 6 refs.

**A73-36916** Intracranial hemodynamic changes in pilots to tilting. A. Radovic, S. Janes, and J. Davidovic (Institute of Aviation Medicine, Zemun, Yugoslavia). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 71-74. 12 refs.

Experiments on 40 young healthy supersonic aircraft pilots tied to a tilt stand in a prone position showed selective changes in the tonus of both general and cerebral circulation. The artery tonus in body parts was higher in the direction of the hydrostatic forces during tilting than in other directions. Significant tachycardia was observed in head-up positions and no significant heart rate changes in head-down positions. V.Z.

**A73-36917** Initial results of a psychophysiological study of certified parachutists (Premiers résultats sur une étude psychophysiological de parachutistes confirmés). P. Gauthier, J. Jouffray,

R. Roux, J. L. J. de Mendoza, and C. Gottesmann. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 75, 76. In French.

Results of a psychophysiological study of the stress reactions occurring in parachutists in order to develop criteria for eliminating inapt individuals. The study included two phases, a laboratory investigation in which the EEG, ECG, and the electrodermal activity are recorded, and analyses are made of the negative contingent variation, the subject's reaction time, and his ability to estimate time durations, and a second phase in which electrophysiological and metabolic recordings are made while the subject is actually performing a parachute jump. A.B.K.

**A73-36918** Psychotechnical selection of flight crews in South Vietnam (La sélection psychotechnique du personnel navigant au Sud-Vietnam). D. X. Giu (Service de Santé de l'Air, Saigon, South Vietnam). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 77, 78. In French.

**A73-36919** Study of Indian naval aircrew experiences and psychic factors in disorientation. N. G. Dudani. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 79-81. 6 refs.

**A73-36920** The mechanisms of the occurrence of emotional stress in man. P. V. Simonov (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 82, 83.

An investigation conducted by Simonov (1970) concerning the information theory of emotions is considered. The degree of emotional stress is the function of at least two factors including the need or motivation and the difference between the prognostically necessary information for its satisfaction and the information available to the subject. It is pointed out that space flight may serve as a good experimental confirmation for the informational theory of emotions. The emotional stress of an astronaut is indicated by his heart rate and the results of a spectral analysis of his voice. G.R.

**A73-36921** Some characteristics of pilot's performance under complicated flight conditions. B. F. Lomov and V. A. Ponomarenko (Akademiia Nauk SSSR, Nauchno-Issledovatel'skii Institut Psikhologii, Moscow, USSR). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 84-86.

The automation of aircraft control processes places the pilot in psychologically contradictory conditions. The pilot remains entirely responsible for the flight outcome although he cannot directly influence performance. The second contradiction is that, given that

automatic control refusals are not excluded, the pilot must be constantly in a state of readiness for an immediate coordinated interference with the control. As a result of an analysis of the psychological structure of pilot's performance in an emergency situation, four types of reactions were identified. G.R.

**A73-36922** Behavioral stress response RE - Passenger briefings and emergency warning systems on commercial airlines. M. A. Becker (USAF, Washington, D.C.; California State University, Los Angeles, Calif.). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 87-89. 10 refs.

One factor that influences the response of people to threat is their perception of the event. Denial is a very common response to any threat, and the individual attempts to place the present sequence of events into the context of previous experience despite the incongruity with reality. Airline safety procedures may be based on assumptions concerning passenger behavior which have not been tested. A number of recommendations are made to increase the survivability ratio of passengers in aircraft accidents, giving attention to emergency briefings and equipment. G.R.

**A73-36923** The problem of early presbyopia in aircrew. M. F. P. Marshall. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 102-104.

The onset of presbyopia is gradual and varies considerably from pilot to pilot. Most pilots have very little error in refraction and few have to wear distance correction. It was noticed in tests that there are variations from 18 to 30 cm in the same age group, all with normal refraction. This, however, does not take into account the varying stages of fatigue at the time of the test. It is important to remember this fact in assessing accommodative power from a single reading, particularly when this may entail endorsing the pilot's license. There is a need to educate pilots in the reasons for wearing reading correction, and a realization on the part of aircraft designers of the necessity to provide clear instrument marking of a reasonable size and to arrange sufficient space to allow the pilot to read at 30 cm. F.R.L.

**A73-36924** Visual problems among senior flight personnel. V. Dreyer (Copenhagen, University, Hospital, Copenhagen, Denmark). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 105, 106.

**A73-36925** The significance of retinal pathology in ageing aircrew. T. J. G. Price (Central Medical Establishment, London, England). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 107-110.

A survey covering the years 1961 to 1970 inclusive was carried out on British civilian and Royal Air Force flying personnel, the intent being to attempt to assess the significance to the individual of a diagnosis of retinal disease. The work 'significance' has been taken to mean the effect this diagnosis has on the individual's flying career, it being held that a minor, short-lived, nonrecurrent attack which produces no fall of visual acuity, little or no loss of visual field, and

no loss of flying status is of little importance. Case reports are discussed which deal with central serous retinopathy, retinitis pigmentosa, and retinal detachment. F.R.L.

**A73-36926** Glaucoma development in aging flight personnel. J. F. Culver (USAF, Washington, D.C.). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 111, 112. 5 refs.

**A73-36927** Management of cataract in commercial flight personnel. G. F. Catlett and G. J. Kidera (United Air Lines, Inc., New York, N.Y.). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 113, 114.

**A73-36928** Binocular vision variation with age in flight crews (Evolution de la vision binoculaire avec l'âge chez le personnel navigant). J. Chevaleraud (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 115-117. In French.

**A73-36929** Results of carbon monoxide poisoning checks following aviation accidents or incidents in the French Army (Résultat des recherches d'intoxications oxycarbonées après accidents ou incidents aériens dans l'Armée Française). A. Vauzelle, P. Pesquies (Armée de l'Air, Service de Santé; Centre de Recherches de Médecine Aéronautique, Paris, France), J. Joliff (Centre Permanent de Sécurité de l'Aviation de la Marine, France), and P. Pingannaud (Ministère des Armées, Service de Santé des Armées, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 118-121. In French.

**A73-36930** A study of Halon 1301 /CBF3/ toxicity under simulated flight conditions. D. W. Call (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 122-124. 5 refs.

**A73-36931** Evaluation of hazard presented by gas-off products from polymeric materials intended for use in space cabins. Iu. P. Bizin, G. M. Gorban, G. I. Solomin, and G. P. Tikhonova. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 125, 126.

**A73-36932** Work in aircraft fuel tanks (Travaux dans les réservoirs d'avion). M. Medvedeff (Compagnie Nationale Air France, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine*

*Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 127-129. In French.*

Review of the maintenance work performed in the fuel tanks of commercial airliners, and discussion of some of its technical and safety aspects. This work is aimed at counteracting the effects of the deformations undergone by the wings containing the fuel tanks and to maintain the tightness of the tanks at their seams through appropriate reapplications of a sealant. M.V.E.

**A73-36933** Hepatic lesions observed among flight crews following aviation accidents (Lésions hépatiques observées chez le personnel navigant après accident aérien). C. Nogues, S. Despres, A. Vauzelle, and J. P. Leclerc (Centre de Recherches de Médecine Aéronautique, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 130-134. 14 refs. In French.*

Review of the results of a histopathological and toxicological study conducted upon refrigerated liver tissue specimens obtained by first-aid personnel from 20 subjects succumbed in six aviation accidents. These results are compared with those of a study performed in a pertinent experiment using rats. M.V.E.

**A73-36934** Evaluation of auditory disorders in pilots by examining intratympanic muscles reflexes. A. Risavi and M. Stojkovic (Institute of Aviation Medicine, Zemun, Yugoslavia). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 135-137.*

It is pointed out that the harmful effects of noise and barotraumatic disorders in the middle and inner ear are very often responsible for hearing impairments in the case of aircraft pilots. An investigation was conducted involving the examination of middle ear muscle reflexes by means of the impedance method. In this method changes of the total resistance of the conductive system of the ear to acoustic stimulus are measured. The subjects examined included 36 pilots with bilateral sensory neural hearing loss and 12 pilots with acute barotraumatic otitis. G.R.

**A73-36935** Ribes Nigrum anthocyanosides in ophthalmology (Les anthocyanosides de Ribes Nigrum en ophtalmologie). F.-J. Renson (Hôpital des Quinze-Vingts, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 138-141. In French.*

The results of 150 observations of cases of diabetic retinopathy in various stages, muscular degeneration, vein thrombosis, and varied cases of etiology are discussed. The patients were treated and followed up over a period of 3 to 15 months and underwent a certain number of checks like the measurement of visual acuity, field of vision, ocular tonus, cutaneous and conjunctival capillary resistance, and examination of the fundus of the eye. In addition, a certain number of fluorescein retinographs and angiographs were made. These observations show as a whole, in addition to excellent tolerance, improvements in the general condition, preventive action as regards retina accidents, stabilization of ophthalmological conditions, and improvements in evolutive pathological conditions. F.R.L.

**A73-36936** The effects of the Westinghouse active magnetometer /WD-4/ on implanted cardiac pacemakers. J. M. Keshishian, N. P. D. Smith (George Washington University; Potomac Fund for Cardiovascular Research, Washington, D.C.), P. V. Siegel (FAA, Washington, D.C.), O. C. Hood, E. Podolak (FAA, Office of Aviation Medicine, Washington, D.C.), A. A. Hoffman, and N. R. Baker (Potomac Fund for Cardiovascular Research, Washington, D.C.). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 142-146.*

**A73-36937** Technique for extemporaneously obtaining an electroencephalogram (Technique d'obtention extemporanée d'un électroencéphalogramme). G. Chatelier (Laboratoire d'Etudes Médico-physiologiques, Mont-de-Marsan, Landes, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 147-149. In French.*

A method of grouping EEG activity together is described which makes it possible to obtain a correct tracing in less than a minute. The principle is based on the use of special electrodes that can be attached to a pilot's helmet. These electrodes consist of small metal tips that can reach the scalp through the hair. With this method a tracing in six leads can be obtained. However, it becomes difficult to wear the helmet fitted with this equipment after 30 to 45 minutes. Another type of electrode, encased in a damp capsule, may also be attached in advance to a pilot's headgear. A tracing can be obtained with it even more quickly, and the headgear can be worn without discomfort for several hours. F.R.L.

**A73-36939** Human physiological responses to high speed aerial tow. D. H. Reid (U.S. Navy, Naval Aerospace Recovery Facility, El Centro, Calif.). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 152, 153.*

**A73-36940** Current aspects of the cochlear function in members of flight crews (Aspect actuel de la fonction cochléaire chez le personnel navigant). P. Blanc and Mr. Bastien (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 154, 155. In French.*

A study was conducted of 6204 audiometry files, belonging to flight crew members. The flight experience of the persons whose files were studied was in the range from 2000 to more than 20,000 hrs. The files of pilots, flight engineers, and navigators were considered, giving attention to differences in the test results between persons below and above the age of forty. It was found that more than 90 per cent of the subjects have normal audition. Effects of barotraumatism were insignificant. G.R.

**A73-36941** The significance of pendulum nystagmography in aviation medicine (Intérêt de la nystagmographie pendulaire en médecine aéronautique). E. Lafontaine and P. Fontenelle (Compagnie Nationale Air France, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société*

*Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 156-159. In French.*

The test considered provides the possibility of an observation of the equilibrium function in a pilot. The studies conducted with 140 subjects during the last five years are reviewed. The persons which were tested included subjects of a reference group, commercial airline pilots, and nonpilot flight crew members. A systematic search for spontaneous nystagmus was combined in the test with a position stimulation, two to check the horizontal ducts and two to check the vertical ducts. It was found that the quantitative modifications observed in the recordings are mainly related to piloting. G.R.

**A73-36942 Study of the heart rate of humans exposed to heat (Etude du débit cardiaque de l'homme exposé à la chaleur).** J. Timbal, C. Boutelier, and J. Colin (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 160-162. 12 refs. In French.*

Results of a study of the heart rate by electrical rheoplethysmography in four subjects subjected to temperatures ranging from 37.5 to 45 C for a 90-minute period. A moderate increase in the heart rate as a function of the thermal load, due essentially to an increase in the cardiac frequency, is noted. With respect to the control values, the heart rate increase scarcely exceeds an average of 40 per cent in environments up to 45 C. Thus, under the experimental conditions, the variations of heart rate and cardiac frequency are still far from reaching the tolerance limits from the cardiovascular standpoint. A.B.K.

**A73-36943 Tolerance to immersion in cold water (Tolérance aux immersions en eau froide).** C. Boutelier, J. Colin, and J. Timbal (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 163-167. 13 refs. In French.*

Description of experiments designed to determine the voluntary tolerance of naked immobile subjects to immersion in water at temperatures ranging from 33 to 24 C. The evolution of losses through convection was determined as a function of water temperature and thickness of skin covering. Tolerance time charts for nude subjects are plotted and compared with the evaluations of tolerance time obtained by Molnar (1946). The discrepancy noted is attributed to the fact that Molnar took his data from a statistical study of shipwreck survivors who were fully dressed, sometimes quite warmly; in contrast to the present study in which the subjects were nude. It is therefore concluded that Molnar's findings are much too optimistic to be applied to nude subjects. A.B.K.

**A73-36944 Comparative value of both hypoxic and positive pressure breathing tests for detection of premature beats.** J. Davidovic, S. Janes, and A. Radovic (Institute of Aviation Medicine, Zemun, Yugoslavia). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 168-173. 19 refs.*

**A73-36945 Estimation of hypoxia tolerance in a decompression chamber (Appréciation de la tolérance à l'hypoxie au caisson à dépression).** M. Gouars, M. Guillermin, G. Chatelier, and P. Galban (Laboratoire d'Etudes Médicophysiologiques, Mont-de-Marsan, Landes, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 174, 175. In French.*

During experimental climbs in a decompression chamber, more than 200 pupil pilots underwent hypoxia tolerance tests at simulated altitudes ranging from 26,000 to 34,000 ft. The lengths of the hypoxia tolerance times recorded are generally much higher than those considered acceptable. The performance of various tests such as letter barrages, computation, playing card recognition, and replies to a questionnaire of professional activity does not seem to be seriously upset by states of hypoxia, whereas recordings of EEG derivations reveal deep alterations in EEG activity. F.R.L.

**A73-36946 The capacity for muscular work in acute hypoxia (La capacité de travail musculaire en hypoxie aiguë).** H. Monod, C. Lemaire, and F. Delavelle (CNRS, Laboratoire de Physiologie du Travail, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 176, 177. 5 refs. In French.*

Physical fitness for general muscular exercise is greatly reduced in a subject exposed to severe acute hypoxia. Neither hyperventilation nor cardiac output increase are in fact sufficient to make up for the drop in partial arterial oxygen pressure. During local muscular work the active muscular mass is slight compared with the adaptation capacities of the respiratory and circulatory functions. That is why the dynamic and static work capacity of the muscle remains at its normal level. Tests of local work with exhaustion were carried out in the supine position with the right brachial biceps. There is no evidence that muscle work capacity is different in a state of hypoxia to what it is in a normal state. F.R.L.

**A73-36947 Study of performances in a warm environment in case of air conditioning breakdown on a supersonic transport (Etude des performances en ambiance chaude en cas de panne de climatisation sur avion de transport supersonique).** J. Colin, J. Timbal, R. Auffret, and C. Boutelier (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.) Revue de Médecine Aéronautique et Spatiale, vol. 12, 1st Quarter, 1973, p. 178-182. 36 refs. In French.*

In order to supplement physiological studies carried out concerning air conditioning failure on SST aircraft, a simultaneous monitoring was made of the performance and physical reactions of subjects in a situation involving altitude and heat. Performance was evaluated from a major task of visual pursuit compensated on two axes and a secondary task of detecting random visual signals. The physiological condition was evaluated by measuring skin and central temperatures and loss of weight. The temperature variation profile agreed with what might be observed after a serious air conditioning failure, and consequently rather unlikely on a SST, with levels extended to 40 and 45 C, and at a cabin altitude of 2000 m. The results obtained with 20 exposures to heat of four subjects confirm the tolerance curve proposed on the basis of physiological criteria. F.R.L.

**A73-36948 Ambient temperature rise effects on pilot performance in a flight simulator (L'effet de l'augmentation de la température ambiante sur la performance du pilote dans un**

simulateur de vol). L. E. Larsson, H. Nilsson, and B. O. Andrae (Laboratoire de Médecine Aéronautique, Malmåslätt, Sweden). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 183-186. 9 refs. In French.

**A73-36950** Gaze-positioning eye movement perturbations during somnolence states (Les perturbations des mouvements de positionnement du regard au cours des états de somnolence). R. Angiboust (Armée de l'Air, Service de Santé; Centre de Recherches de Médecine Aéronautique, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 191, 192. 5 refs. In French.

**A73-36951** Atmospheric regeneration in closed chambers by potassium superoxide (Régénération d'atmosphère d'enceintes closes par le superoxyde de potassium). H. Ducros, J. Colin (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne, France), M. Rio, and J. Chovet (L'Air Liquide, Loges-en-Josas, Yvelines, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 193-196. In French.

Description of a series of experiments designed to verify that potassium superoxide is actually capable of regenerating the air in a sealed cabin at normal, hyperbaric, and hypobaric atmospheric pressures. The experiments described included a thirteen-hour test in a sealed cabin, a sixty-hour test in a sealed cabin, and an operational test in a diving saucer at normal pressures, as well as tests in sealed cabins at pressures simulating an underwater dive to depths of 30 and 300 meters and an ascent to an altitude of 3000 meters. The use of potassium superoxide for regenerating confined air is found to be fully satisfactory under all of the investigated conditions. A.B.K.

**A73-36952** Digestive hemorrhages in aircrew - Individual and collective safety (Hémorragies digestives chez les navigants - Sécurité individuelle et collective). J. P. Hardouin and J. Pasquet (Compagnie Nationale Air France, Paris, France). (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 197-199. 5 refs. In French.

**A73-36953** Problems related to high-performance flight in the Arctic regions (Problèmes relatifs au vol à haute performance dans l'Arctique). P. Samson. (*Académie Internationale de Médecine Aéronautique et Spatiale and Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Congrès International de Médecine Aéronautique et Spatiale, 20th, Nice, France, Sept. 18-21, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 12, 1st Quarter, 1973, p. 200, 201. In French.

Problems of vision affecting fighter pilots in the Arctic regions are reviewed, with special attention to the phenomenon of 'white-out.' The risks inherent in the operation of high-performance fighter aircraft under these conditions are discussed in terms of the atmospheric and human factors involved. M.V.E.

**A73-36962 #** Some metric characteristics of myocardial cells under various conditions of cardiac and cardiovascular pathology (Nekotorye metriccheskie pokazateli miokardial'nykh kletok v usloviakh razlichnoi patologii serdtsa i serdechno-sosudistoi sistemy). I. Ia. Eristavi (Tbilisskii Gosudarstvennyi Meditsinskii Institut, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol. 70, May 1973, p. 473-476. 7 refs. In Russian.

**A73-36983 \*** Blood electrolytes and exercise in relation to temperature regulation in man. J. E. Greenleaf (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). In: *The pharmacology of thermoregulation; Proceedings of the Symposium, San Francisco, Calif., July 23-28, 1972.* Basel, S. Karger AG, 1973, p. 72-84. 66 refs.

It is shown that the body temperature rise during physical exercise is a regulated process and is not due to a failure of heat-dissipating mechanisms. Core and skin temperatures do not provide sufficient information to account for the control of sweating during exercise. Evidence is presented that suggests an association between equilibrium levels of rectal temperature and the osmotic concentration of the blood with essentially no influence from variations in plasma volume. M.V.E.



## STAR ENTRIES

**N73-26056\*#** Public Health Service Hospital, San Francisco, Calif. Dept. of Medicine.

### **A STUDY OF VENTRICULAR CONTRACTILITY AND OTHER PARAMETERS POSSIBLY RELATED TO VASODEPRESSOR SYNCOPE**

Kenneth H. Hyatt, Robert W. Sullivan, William R. Spears, and William R. Vetter May 1973 89 p refs

(NASA Order T-81035)

(NASA-CR-128968) Avail: NTIS HC \$6.50 CSCL 06P

The effects of diminished orthostatic and exercise tolerance resulting from prolonged bedrest were studied by noninvasive methods to determine if alterations in myocardial contractility were induced by bedrest. These methods were apexcardiography, systolic time intervals, and echocardiography. It is concluded that bedrest causes detrimental alterations in the contractile state of the myocardium which accounts for the decreases in maximal oxygen uptake during exercise after bedrest. Tabulated test data are included. F.O.S.

### **N73-26057#** Civil Aeromedical Inst., Oklahoma City, Okla. **SIMULATED SONIC BOOMS AND SLEEP: EFFECTS OF REPEATED BOOMS OF 1.0 PSF**

William E. Collins and P. F. Lampietro Dec. 1972 30 p refs (FAA-AM-72-35) Avail: NTIS HC \$3.50

The effects of repeated simulated sonic booms on sleeping male subjects were investigated. The techniques for conducting the tests are described. No statistically significant effect of the boom presentations on nightly sleep patterns was observed. It was noted that individual booms aroused ECG, EMG, and BSR responses in all eight subjects. Author

**N73-26058\*#** Food and Drug Administration, Cincinnati, Ohio. Food Research Lab.

### **ECOLOGY AND THERMAL INACTIVATION OF MICROBES IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS** Quarterly Progress Report, 1 Oct. - 31 Dec. 1972

J. E. Campbell et al Mar. 1973 6 p

(Contract NASA Order W-13411)

(NASA-CR-133223; QPR-31) Avail: NTIS HC \$3.00 CSCL 06M

The thermal inactivation curve for *Bacillus subtilis* var. niger spores on the Viking lander is examined. Tests were conducted at 113 C and 25% RH, and over a wide range of temperatures using < .001% RH and additions of P2O5 to dry the environment. Results show the 25% RH environment did not significantly reduce the survival curve, while the survival curves for spores treated under the drier .001% RH environment was reduced by a factor of 3. E.H.W.

**N73-26059\*#** Food and Drug Administration, Cincinnati, Ohio. Food Research Labs.

### **ECOLOGY AND THERMAL INACTIVATION OF MICROBES IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS** Quarterly Progress Report, 1 Jan. - 31 Mar. 1973

J. E. Campbell Jun. 1973 9 p

(Contract NASA Order W-13411)

(NASA-CR-133224; QPR-32) Avail: NTIS HC \$3.00 CSCL 06M

Studies were made of atypical organisms found in *Bacillus*

*subtilis* var. niger spore colonies. Efforts were aimed at: (1) determining the heat sensitivity of these atypical white spores treated under dry heat conditions and their influence on the nature of the survival curve, (2) preparing a new spore crop obtained from spore isolates by purification procedures, and (3) comparing spore crops obtained from Cape Kennedy (SSM-10) and Minnesota (Minn. sp. AAEF) with the old Cincinnati and new purified Cincinnati spore crop under dry heat conditions.

Author

**N73-26060#** Royal Aircraft Establishment, Farnborough (England).

### **OXYGEN DIFFUSION IN THE BRAIN. PART 1: SPATIAL CONCEPTION AND CALCULATION OF OXYGEN DIFFUSION**

K. Diemer Oct. 1972 14 p ref Transl. into ENGLISH from Pflugers Arch. (West Germany), v. 285, 1965 p 99-108 (RAE-Lib-Trans-1683; BR32232) Avail: NTIS HC \$3.00

A new model of oxygen diffusion in the brain is developed, based on anatomical investigations and theoretical considerations. In this cone model it is assumed that the diffusion path is determined by the difference between the pO sub 2 at a given point in the capillary and the minimum tissue pO sub 2; a larger region is supplied by the arterial end of the capillary with its higher pO sub 2 than by its venous end. The limit of the region of tissue supplied by a capillary is formed by the isobar of the minimum tissue pO sub 2, the path of which is variable and dependent on various factors. It is fundamentally conceivable that oxygen also diffuses into the tissue from the venous end of the capillary, i.e. that the volume supplied by a capillary becomes a truncated cone. For normal conditions however it is quite likely that the mean intercapillary distance is largely identical with the diffusion path of oxygen from the arterial end of the capillary, while practically no oxygen diffuses into the tissue from the venous end of the capillary. Author

**N73-26061#** Royal Aircraft Establishment, Farnborough (England).

### **THE RAPID DETERMINATION OF ALDOSTERONE IN URINE BY PAPER CHROMATOGRAPHY**

Laszlo Debrecei and Bela Csate Dec. 1972 11 p refs Transl. into ENGLISH from Orv. Hetil. (Hungary), v. 112, no. 33, 1971 p 1976-1977

(RAE-Lib-Trans-1682; BR33271) Avail: NTIS HC \$3.00

Described is a method for measuring aldosterone in urine. After initial purification the aldosterone isolated in a short time in a Mattox and Lewbart formamide, impregnation system, its detection is performed by means of a tetrazolium blue reaction, while the quantitative measurements are made using a Specol spectro-colorimeter. This rapid and simple method can be adopted by laboratories which are not equipped for the determination of hormones. Author

**N73-26062#** Royal Aircraft Establishment, Farnborough (England).

### **FRACTIONING AND DETERMINATION OF CORTICOSTEROIDS IN URINE BY THIN LAYER CHROMATOGRAPHY**

O. Nishikaze, R. Abraham, and H. J. Staudinger Feb. 1973 11 p refs Transl. into ENGLISH from J. biochem. (Tokyo), v. 54, no. 5, 1963 p 427-431

(RAE-Lib-Trans-1694; BR34103) Avail: NTIS HC \$3.00

A method of thin layer chromatography for separating the total urine corticosteroids into five fractions. The method is suitable for use in clinical laboratories for its savings in time and apparatus, and produces fractioning patterns for pathological urines which we feel to be useful for diagnostic evaluation. Standard values for the fractions obtained by this method are reported, together with the results of fractioning for some typical pathological cases. Author

**N73-26063\*#** Hardin-Simmons Univ., Abilene, Tex.

### **A STUDY OF PSYCHROPHILIC ORGANISMS ISOLATED FROM THE MANUFACTURE AND ASSEMBLY AREAS OF**

**SPACECRAFT TO BE USED IN THE VIKING MISSION, 1 JANUARY - 30 JUNE 1973**

Terry L. Foster and Luther Winans, Jr. Jul. 1973 44 p Presented at the Semiannual NASA Spacecraft Sterilization Technol. Seminar, Denver, 11-12 Jul. 1973 (Grant NGR-44-095-001) (Rept-2) Avail: NTIS HC \$4.25 CSCL 06M

Soil samples from the areas associated with the Viking spacecraft were analyzed for major generic groups of microorganisms and the percentage of obligate psychrophiles. Results are presented which show the distribution of organisms isolated at low temperatures and the methods employed for subjecting samples to simulated Martian conditions. Emphasis is placed on application of these results to the objectives of the quarantine program. G.G.

**N73-26064\*#** Scientific Translation Service, Santa Barbara, Calif.

**SYNTHESIS RATE OF PHOSPHOLIPIDS AND CYTOCHROMES b5 AND P-450 IN THIAMINE-DEFICIENT RATS AFTER TREATMENT WITH THIAMINE**

H. J. Roethig, H. Reinauer, and S. Hollmann Washington NASA Jul. 1973 2 p Transl. into ENGLISH from Herbsttagung der Gesellschaft fuer Biologische Chemie (West Germany), v. 353, 1972 p 1562

(Contract NASw-2483)

(NASA-TT-F-14989) Avail: NTIS HC \$3.00 CSCL 06C

The content and synthesis rate of phospholipids in heart, liver, brain and kidney, as well as the content of cytochromes b5 and P450 in the liver of thiamine-deficient rats was investigated. Author

**N73-26065\*#** Techtran Corp., Silver Spring, Md.

**ISCHEMIC HEART DISEASE AND COSMIC RADIATION**  
N. N. Kuchin and Ye. V. Kolomeyets Washington NASA Jul. 1973 10 p Transl. into ENGLISH from Zdravookhr. Kazakhstana (USSR), no. 3, Mar. 1973 p 19-22

(Contract NASw-2485)

(NASA-TT-F-14992) Avail: NTIS HC \$3.00 CSCL 06R

A brief exposition is presented of a theory that there is a relationship (inverse) between peaks of cosmic radiation and episodes of myocardial infarct and medullary insult. A brief statistical analysis is given for selected years to support the hypothesis, not considering, however, other seasonal factors. Author

**N73-26066\*#** Exotech Systems, Inc., Falls Church, Va.

**SCIENTIFIC AND TECHNICAL SERVICES DIRECTED TOWARD THE DEVELOPMENT OF PLANETARY QUARANTINE MEASURES FOR AUTOMATED SPACECRAFT**  
Quarterly Progress Report, period ending 30 Jun. 1973

Jul. 1973 40 p ref

(Contract NASw-2503)

(NASA-CR-133202: QR-1) Avail: NTIS HC \$4.00 CSCL 06M

The work performed for 12 tasks in the development of planetary quarantine measures is reported. P(st) analysis is discussed along with the early Teflon strip experiment analysis. F.O.S.

**N73-26067\*#** Research Triangle Inst., Research Triangle Park, N.C.

**APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE** Semiannual Report, Sep. 1972 - Feb. 1973

Feb. 1973 100 p

(Contract NASw-2459)

(NASA-CR-133226) Avail: NTIS HC \$7.00 CSCL 06E

The results are reported of the medically related activities of the NASA Application Team Program at the Research Triangle Institute. Fourteen medical organizations are presently participating in the RTI Application Team Program: The accomplishments of

the Research Triangle Institute Application Team during the reporting period were as follows: The team identified 21 new problems for investigation, accomplished 4 technology applications and 3 potential technology applications, closed 21 old problems, and on February 28, 1973, had a total of 57 problems under active investigation. Author

**N73-26068#** Argonne National Lab., Ill. Center for Human Radiobiology.

**RADIOLOGICAL AND ENVIRONMENT RESEARCH DIVISION. PART 2: BIOLOGY AND MEDICINE** Annual Report, Jul. 1971 - Jun. 1972

Jun. 1972 265 p refs

(Contract W-31-109-eng-38)

(ANL-7960-Pt-2: AR-3) Avail: NTIS

Current work on the development of machine methods for karyotyping chromosomes and scoring aberrations in cases of radiation damage is described. The favored approach is a system of interaction between a human operator and computer programs, employing in ALICE image processing system. Author (NSA)

**N73-26069#** Defence Research Information Centre, Orpington (England).

**THE USE OF OXYGEN IN THE DECOMPRESSION AND REMEDIAL RECOMPRESSION OF DIVERS**

B. A. Zheifets-Tetelbaum, E. E. Rozov et al. Apr. 1973 7 p refs Transl. into ENGLISH from Voenna Med. Zh. (Moscow), Dec. 1970 p 52-54

(DRIC-Trans-3095: BR-30444) Avail: NTIS HC \$3.00

The effects of oxygen breathing in decompression sickness and remedial recompression of divers are presented. Some cases of decompression sickness occurring after deep-water submersion are analyzed, and the general characteristics of decompression sickness are given. The choice of the regime of remedial recompression depends on the nature of the symptoms of the sickness and the intensity of their development, and on the depth of descent underwater. It is shown that prevention of decompression sickness requires strict control of the oxygen part of the decompression regime by the doctor, following underwater submersion. In cases where decompression sickness occurs, the application of oxygen in the stage when pressure is reduced during remedial recompression is a promising technique. The increase in the rate of desaturation of the organism from inert gases improves conditions for the dispersion of gas bubbles. ESRO

**N73-26070#** Naval Submarine Medical Research Lab., Groton, Conn.

**DIFFERENCES IN THE SPEED OF MENTALLY PROCESSING DISPLAYS CONTAINING INFORMATION ABOUT RIGHT AND LEFT** Medical Research Progress Report No. 3

Gary M. Olson and Kevin V. Laxar 29 Aug. 1972 19 p refs (MF51524004)

(AD-759723; NSMRL-725) Avail: NTIS CSCL 05/10

The results of a series of experiments using simple word-picture verification tasks showed that the mental representation of the term right is the simpler or unmarked one of the pair right - left. True matches involving the term right took less time than true matches for left or than false matches, and this held whether Ss interpreted the displays from their own perspective or from the perspective of someone facing them. However, substituting arrows for the words in the displays eliminated the effect. Thus, the asymmetry depended upon mentally representing the two directions and not upon visual scanning biases or reading habits. These data are discussed in relation to a general model of how Ss conceptualize space. In addition, problems of S-R compatibility that arise in reaction time tasks using right and left are discussed. Author (GRA)

**N73-26071\*** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**TEMPERATURE CONTROLLER FOR A FLUID COOLED**

**GARMENT Patent**

Alan B. Chambers, James R. Blackaby, and John Billingham, inventors (to NASA) Issued 5 Jun. 1973 9 p Filed 25 Apr. 1972 Supersedes N72-25129 (10 - 16, p 2114) (NASA-Case-ARC-10599-1; US-Patent-3,736,764; US-Patent-Appl-SN-247481; US-Patent-Class-62-89; US-Patent-Class-165-46; US-Patent-Class-62-176; US-Patent-Class-62-259; US-Patent-Class-62-207; US-Patent-Class-62-209; US-Patent-Class-2-2.1) Avail: US Patent Office CSCL 06Q

An automatic controller for controlling the inlet temperature of the coolant to a fluid cooled garment without requiring skin sensors is described. Temperature is controlled by the wearer's evaporative water loss rate. E.H.W.

**N73-26072\*** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**VISUAL EXAMINATION APPARATUS Patent**

Richard F. Haines, James W. Fitzgerald, and Salvadore A. Rositano, inventors (to NASA) Issued 5 Jun. 1973 9 p Filed 6 Jul. 1971 Supersedes N72-21079 (10 - 12, p 1563) (NASA-Case-ARC-10329-1; US-Patent-3,737,217; US-Patent-Appl-SN-159857; US-Patent-Class-351-23; US-Patent-Class-128-2.1R; US-Patent-Class-351-30; US-Patent-Class-351-36) Avail: US Patent Office CSCL 06B

An automated visual examination apparatus for measuring visual sensitivity and mapping blind spot location is described. The apparatus includes a projection system for displaying to a patient a series of visual stimuli, a response switch enabling him to indicate his reaction to the stimuli, and a recording system responsive to both the visual stimuli per se and the patient's response. The recording system provides a correlated permanent record of both stimuli and response from which a substantive and readily apparent visual evaluation can be made.

Official Gazette of the U.S. Patent Office

**N73-26073\*#** Translation Consultants, Ltd., Arlington, Va.

**MECHANICS OF MACHINES, NO. 27/28**

I. I. Artobolevskiy Washington NASA Jun. 1973 235 p refs Transl. into ENGLISH of the publ. "Mekhanika Mashin, Volume 27-28" Nauka Press, Moscow, 1971 p 1-171 (Contract NASw-2038)

(NASA-TT-F-14336) Avail: NTIS HC \$13.75 CSCL 05H

Theory and methods for analyzing and designing mechanisms for manipulators, and of their systems of manual, bioelectric, and automatic control are reported.

**N73-26074\*** Translation Consultants, Ltd., Arlington, Va.

**SECOND SYMPOSIUM ON THE THEORY AND PRINCIPLES OF MANIPULATOR DESIGN (FEBRUARY 8-9, 1968)**

I. I. Artobolevskiy and A. Ye. Kobrinskiy *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 1-3

CSCL 05H

The theory and principles of manipulator design is discussed. Different uses of manipulators are presented, including their use as space equipment. Designations are suggested for the basic elements of a manipulator. Author

**N73-26075\*** Translation Consultants, Ltd., Arlington, Va.

**FEATURES OF THE KINEMATICS OF MANIPULATORS AND VOLUMES METHODS**

I. B. Vinogradov, A. Ye. Kobrinskiy, Yu. A. Stepanenko, and L. I. Tyves *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 4-19 refs

CSCL 05H

A volumetric method of kinematic analysis of a manipulator which can be used in addition to the conventional trajectory method is presented. An ideal manipulator, the influence of limitations on the angles of rotation of the manipulator, and a manipulator with limitations in all joints are discussed. Author

**N73-26076\*** Translation Consultants, Ltd., Arlington, Va.

**SOME REMOTELY CONTROLLED MASTER-SLAVE MANIPULATOR DESIGN PROBLEMS**

N. A. Lakota and V. I. Lobachev *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 20-36 refs

CSCL 05H

A number of specific requirements for designing remotely controlled master-slave manipulators, including the kinematics and the dimensions of the master and slave members, are presented. General requirements for master-slave manipulator control systems are discussed. Author

**N73-26077\*** Translation Consultants, Ltd., Arlington, Va.

**KINEMATIC ANALYSIS OF SPATIAL SLAVE MECHANISMS FOR MANIPULATORS BY THE MATRIX METHOD**

Ye. I. Vorobyev *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 37-47 refs

The use of spatial mechanisms with many degrees of freedom as manipulator slave mechanisms is discussed. An analysis of these mechanisms by the matrix of 3rd order method is presented. Author

**N73-26078\*** Translation Consultants, Ltd., Arlington, Va.

**SOME QUESTIONS OF THE DISCRETE CONTROL OF DEEP-WATER MANIPULATORS**

E. L. Onishchenko *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 48-57 refs

CSCL 05H

The use of manipulators to take geological samples and install measuring instruments on the ocean floor is discussed. Methods of performing complex operations using a manipulator connected by cable to the command element are presented. Author

**N73-26079\*** Translation Consultants, Ltd., Arlington, Va.

**PROSPECTS FOR THE BUILDING AND USE OF COMPUTER CONTROLLED MANIPULATORS**

M. B. Ignatyev, F. M. Kulakov, and A. M. Pokrovskiy *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 58-72 refs

CSCL 05H

The economic advantages of computer controlled manipulators are discussed. The basic stages of the work required to build automatic manipulators, as well as a linguistic approach to the synthesis of control programs for manipulator movement, are also presented. Author

**N73-26080\*** Translation Consultants, Ltd., Arlington, Va.

**SOME PRINCIPLES INVOLVED IN THE CONSTRUCTION OF UNAMPLIFIED CONTROL SYSTEMS FOR ELECTRO-MECHANICAL MANIPULATORS**

Ya. I. Aronov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 73-82 refs

CSCL 05H

The requirements for manipulator control systems are listed. General principles involved in the construction of unamplified reversible follow-up systems using selsyns are discussed. Author

**N73-26081\*** Translation Consultants, Ltd., Arlington, Va.

**PRINCIPAL PARAMETERS AND OPERATING INDICES FOR REVERSIBLE FOLLOW-UP SYSTEMS**

V. S. Kuleshov and I. N. Yegorov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 83-97 refs

CSCL 05H

An engineering approach to the analysis of the principal parameters and operating indices for reversible follow-up systems is presented. Structurally symmetrical and structurally asymmetrical systems are discussed. Author

**N73-26082\*** Translation Consultants, Ltd., Arlington, Va.  
**SOME QUESTIONS FROM THE USE OF REVERSIBLE FOLLOW-UP SYSTEMS WITH INDEPENDENT FOLLOW-UP AND FORCE REPRODUCTION CHANNELS**  
 B. A. Petrov and V. Ye. Paramonov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 98-112 refs

CSCL 04H

The use of independent follow-up and force reproduction channels in manipulators are discussed. The question of selecting the site of operator influence, as well as of the use of the slave mechanism as the reproduction channel output, are considered.

Author

**N73-26083\*** Translation Consultants, Ltd., Arlington, Va.  
**AN ANALYTICAL METHOD FOR THE SYNTHESIS OF REVERSIBLE FOLLOW-UP SYSTEMS**  
 M. S. Voroshilov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 113-130  
 CSCL 05H

The technical and design requirements of reversible follow-up systems are presented. A synthesis scheme is proposed for the realization of these requirements.

Author

**N73-26084\*** Translation Consultants, Ltd., Arlington, Va.  
**THE QUESTION OF MANIPULATOR ACTIVATION BY REVERSIBLE FOLLOW-UP SYSTEMS**  
 Yu. A. Stepanenko *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 131-137 refs  
 CSCL 04H

The problems of manipulator activation by reversible follow-up systems in each of the drives are discussed. These include the mismatches between input and output coordinates, and the manipulator tongs and their corresponding master arm element, as well as the problems of precision and activation in one drive and the simultaneous operation of all drives.

Author

**N73-26085\*** Translation Consultants, Ltd., Arlington, Va.  
**AN INVESTIGATION OF ENGINEERING METHODS OF DESIGNING ELECTROHYDRAULIC FOLLOW-UP DRIVES FOR UNDERWATER MANIPULATORS**  
 V. S. Yastrebov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 138-153 refs  
 CSCL 04H

Engineering methods of analysis and synthesis of electrohydraulic control system for underwater manipulators with position feedbacks are discussed. An approximation of a control system by an aperiodic unit is presented.

Author

**N73-26086\*** Translation Consultants, Ltd., Arlington, Va.  
**THE FIRST EXPERIMENT IN BUILDING AN AIRTIGHT MAGNETOMECHANICAL MASTER-SLAVE MANIPULATOR**  
 V. A. Ovsyannikov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 154-161 refs  
 CSCL 05H

The use of magnetic couplings to make manipulators airtight is discussed. The special properties of magnetic couplings and magnetomechanical transmissions making their use in manipulators advantageous are presented.

Author

**N73-26087\*** Translation Consultants, Ltd., Arlington, Va.  
**THE INFLUENCE OF MANIPULATOR KINEMATICS ON THE SELECTION OF THE GEOMETRIC PARAMETERS OF BOXES AND CHAMBERS**  
 G. I. Lukishov and Yu. V. Miloserdin *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 162-173 refs

CSCL 05H

The role working condition kinematics play in selecting the geometric parameters of boxes and chambers is discussed. Efficiency and cost factors are evaluated.

Author

**N73-26088\*** Translation Consultants, Ltd., Arlington, Va.  
**PRINCIPLES OF THE CURTAILMENT OF SOURCES OF COMMAND SIGNAL IN MULTIFUNCTIONAL BIOELECTRIC CONTROL SYSTEMS**  
 Ye. P. Polyan, A. Yu. Shneyder, and E. I. Plamm *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 174-186 refs

CSCL 05H

Bioelectric control systems for several slave mechanisms using a single muscle are discussed.

Author

**N73-26089\*** Translation Consultants, Ltd., Arlington, Va.  
**SYNCHRONISM AND HETEROCHRONISM OF SYNKINESIS IN MAN**  
 I. P. Blokhin, A. B. Gandelsman, G. S. Kan, and A. M. Pokrovskiy *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 187-199 refs  
 CSCL 05H

The potentials of arbitrary synchronization of synkinesis in man is studied, as are elementary flexing and extension single joint movements of the different links in the body.

Author

**N73-26090\*** Translation Consultants, Ltd., Arlington, Va.  
**THE POSSIBILITIES OF MAKING QUANTITATIVE EVALUATIONS OF THE FUNCTIONING OF CLOSED PEOPLE-OPERATOR CONTROL SYSTEMS**  
 V. A. Taran, A. D. Korotkov, Yu. N. Kofanov, A. A. Belov, and I. G. Shramkov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 200-219 refs  
 CSCL 05H

The three tasks comprising the specific sections of the general methodology for evaluating ergatic systems are reviewed.

Author

**N73-26091\*** Translation Consultants, Ltd., Arlington, Va.  
**THE QUESTION OF MODELING CERTAIN MOTOR FUNCTIONS OF THE HUMAN ARM**  
 A. V. Smirnov and B. S. Yastrebov *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 220-225 refs

CSCL 05H

The modeling of the motor functions of the human arm by master-slave manipulators is discussed. The use of the lateral pulse method to modulate the control signal is presented.

Author

**N73-26092\*** Translation Consultants, Ltd., Arlington, Va.  
**DETERMINATION OF THE SPATIAL POSITIONS OF THE LINKS IN A MANIPULATOR MECHANISM**  
 A. V. Sinev and Yu. A. Stepanenko *In its Mech. of Machines*, no. 27/28 Jun. 1973 p 226-231 refs

CSCL 05H

Screw calculus methods are used in an effort to determine the position of a manipulator in space.

Author

**N73-26093\*#** Techtran Corp., Silver Spring, Md.  
**THE WORK AND REST REGIME OF COSMONAUTS**  
 Ye. Karpov and V. Bodrov Washington NASA Jul. 1973 8 p Transl. into ENGLISH from *Aviatsiya i Kosmonavtika* (Moscow), no. 5, May 1973 p 38-39  
 (Contract NASw-2485)  
 (NASA-TT-F-14990) Avail: NTIS HC \$3.00 CSCL 05E

The cosmonauts work-rest regime is discussed as a major problem to be overcome in space flight. The essential physiological and physiological problems encountered (disruptions of the sleep-wakefulness cycle, poor quality sleep, loss of appetite) and possible ways to overcome them are cited. A chart is provided for a crew regime for crews consisting of various numbers of persons. The schedule in the chart does not provide optimum results.

Author

**N73-26094\*** AiResearch Mfg. Co., Los Angeles, Calif.  
**INTERMEDIATE WATER RECOVERY SYSTEM** Final Report  
 G. Deckman and A. R. Anderson, ed. 12 Apr. 1973 117 p  
 (Contract NAS9-11996)  
 (NASA-CR-128983; Rept-72-8901-Rev-1) Avail: NTIS HC  
 \$8.00 CSCL 061

A water recovery system for collecting, storing, and processing urine, wash water, and humidity condensates from a crew of three aboard a spacecraft is described. The results of a 30-day test performed on a breadboard system are presented. The intermediate water recovery system produced clear, sterile, water with a 96.4 percent recovery rate from the processed urine. Recommendations for improving the system are included. F.O.S.

**N73-26095#** Acurex Corp., Mountain View, Calif. Aerotherm Div.

**ANALYSIS OF THE THERMAL RESPONSE OF PROTECTIVE FABRICS** Technical Report, Jun. 1971 - Jun. 1972

Howard L. Morse, James G. Thompson, Kimble J. Clark, Kenneth A. Green, and Carl B. Moyer Wright-Patterson AFB, Ohio AFML Jan. 1973 221 p refs

(Contract F33615-72-C-1298; AF Proj. 7320)

(AD-759525; AFML-TR-73-17) Avail: NTIS CSCL 06/17

The objective of the program was to develop a theoretical and empirical mathematical relationship to define the fabric-skin system's response when exposed to a JP-4 fuel fire. Critical fabric parameters, such as optical, thermo-chemical and physical characteristics are defined in a manner which will allow the fabric designer to develop improved thermally protective light weight fabrics. The computer code evaluates the model parameter variation in terms of resultant human skin burns. A comparison of the analytical model results with laboratory and fire pit data demonstrates excellent correlation within the limits of the present study. (Author Modified Abstract) GRA

**N73-26096#** McDonnell-Douglas Astronautics Co., St. Louis, Mo.

**RELATIONSHIPS BETWEEN DESIGN CHARACTERISTICS OF AVIONICS SUBSYSTEMS AND TRAINING COST, TRAINING DIFFICULTY, AND JOB PERFORMANCE** Final Report, 1 Jul. 1971 - 1 Sep. 1972

Larry M. Lintz, Susan L. Loy, Raymond Hopper, and Kenneth W. Potempa Jan. 1973 65 p refs

(Contract F33615-71-C-1620; AF Proj. 1124)

(AD-759583; AFHRL-TR-72-70) Avail: NTIS CSCL 05/9

The relationships between subsystem design characteristics, training cost, training difficulty, and job performance were investigated for avionics subsystems. A list of relevant design characteristics was established. Functional loops were selected from 10 subsystems representing navigation, flight control, communications, and fire control subsystems. Performance tests for each of the 30 functional loops were identified or constructed. Ten AF students performed each of the tests. Time and errors were recorded for using equipment and reading technical orders (T.O.'s). Both stepwise regressions and factor analysis were used to derive equations to predict performance time, training time, T.O. time, errors, and training equipment cost from equipment design characteristics, personnel characteristics, and environmental variables. Multiple correlation coefficients were 0.88 or greater. Factors of length of checkout procedure, equipment complexity, difficulty of checkout steps, nonautomatic checkout, diagnostic information, and clarity of information were identified. Applications of these equations should, for the present, be made cautiously, particularly if any of the input data fall outside the ranges which entered into derivation of the equations. (Author Modified Abstract) GRA

**N73-26097#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

**THE USAF AIRCRAFT MAINTENANCE MANPOWER PROCESS: 1947 THROUGH 1972** M.S. Thesis

Gustav S. VonWolffradt and Gary D. Worrell 7 Mar. 1973 140 p refs

(AD-760082; SLSR-5-73A) Avail: NTIS CSCL 05/9

Since manpower is the largest consumer of Air Force dollars, the problem of determining accurate manpower requirements has been present throughout the existence of the Air Force. An emphasis is placed on accurate maintenance manning, primarily due to the scale of the maintenance task. The problem is that no systematic research has been performed to determine if current methods provide for an equitable distribution of aircraft maintenance manpower within the constraints of efficient resource utilization. The thesis identifies conditions that have molded manpower and maintenance policies in the past and follows their evolving path to the methods of determining aircraft maintenance manpower as of 1972. GRA

**N73-26098#** Naval Submarine Medical Research Lab., Groton, Conn.

**HANDEDNESS AND ADAPTATION TO DISTORTIONS OF SIZE AND DISTANCE UNDER WATER** Medical Research Progress Report

S. M. Luria, Christine L. McKay, and Steven H. Ferris 28 Aug. 1972 19 p refs

(AD-759722; NSMRL-724; PR-12) Avail: NTIS CSCL 05/10

Both before and after 15 minutes of adaptation under water, 20 right-handed and 20 left-handed or ambidextrous subjects made size matches to standard rectangles and were tested for hand-eye coordination. Nearly all showed a reduction in the amount of distortion to position after adaptation with no significant differences as a function of handedness. In other respects, however, the two groups showed great dissimilarities. The results for the right-handers were consonant with previous reports of a negative correlation between magnitudes of adaptation to size and distance, but this was not true for the left-handers. The effect of previous diving experience also differed for the two groups. Finally, the left-handers consistently showed increased distortion in the perception of size after adaptation, but the right-handers did not. Thus, only the left-handers showed true counter-adaptation (increased distortion after adaptation) but only the right-handers showed negative correlations between two modalities of adaptation. (Author Modified Abstract) GRA

**N73-26099#** Army Environmental Hygiene Agency, Edgewood Arsenal, Md.

**EVALUATION OF HADRON MODEL 112 LASER SAFETY EYESHIELDS, JANUARY - MARCH 1973** Radiation Protection Special Study

David H. Sliney and James E. Walkenback 2 May 1973 18 p refs

(AD-759921; USAEHA-42-57-73) Avail: NTIS CSCL 06/17

Four types of Hadron laser safety eyeshields were evaluated from the standpoint of adequacy for protecting personnel from accidental ocular exposure from most common lasers. The eyeshields were found to be adequate to protect personnel exposed to the direct beam, or reflections of the direct beam, of most commercially available lasers. Tests using several types of lasers revealed that the eyeshields had optical densities as specified by the manufacturer within the measurement capabilities of this agency. (Author Modified Abstract) GRA

**N73-27052\*** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**METHOD OF DETECTING AND COUNTING BACTERIA IN BODY FLUIDS** Patent

Emmett W. Chappelle and Grace L. Picciolo, inventors (to NASA) Issued 10 Jul. 1973 8 p Filed 30 Apr. 1971 Continuation-in-part of abandoned US Patent Appl. SN-60950, filed 4 Aug. 1970

(NASA-Case-GSC-11092-2; US-Patent-3,745,090;

US-Patent-Appl-SN-139250; US-Patent-Class-103.5R;

US-Patent-Appl-SN-60950) Avail: US Patent Office CSCL 06M

A novel method is reported for determining bacterial levels in urine samples, which method depends on the quantitative

determination of bacterial adenosine triphosphate (ATP) in the presence of non-bacterial ATP. After the removal of non-bacterial ATP, the bacterial ATP is released by cell rupture and is measured by an enzymatic bioluminescent assay using an enzyme obtained from the firefly. Official Gazette of the U.S. Patent Office

**N73-27053#** Joint Publications Research Service, Arlington, Va.

**THE STATE AND PROSPECTS OF BIOGEOCENOLOGICAL RESEARCH**

M. A. Golubets 29 Jun. 1973 16 p refs Transl. into ENGLISH from Visn. Akad. Nauk Ukr. RSR (Ukraine SSR), no. 1, 1973 p 76-84

(JPRS-59395) Avail: NTIS HC \$3.00

A discussion is presented of biogeocenology which is the theoretical basis of the protection, restoration, and multiplication of the biological resources of our planet. Author

**N73-27054\*#** Kanner (Leo) Associates, Redwood City, Calif.  
**STIMULATION OF PANTING BY ISOLATED HEATING OF THE SPINAL COLUMN IN THE WAKE DOG**

C. Jessen Washington NASA Jul. 1973 25 p refs Transl. into ENGLISH from Pfluegers Arch. (West Ger.), v. 297, 1967 p 53-70

(Contract NASw-2481)

(NASA-TT-F-14998) Avail: NTIS HC \$3.25 CSCL 06C

In 10 wake dogs, the spinal cord was heated selectively by means of a polythene thermode implanted semipermanently in the peridural space; 58 heating periods were applied in 25 experiments at ambient air temperatures of 19 to 27 C. In five animals selective heating of the spinal cord regularly led to an increase in respiratory rate and to panting, which resembled thermal panting under external heat stress. The extent to which respiratory rate was increased was found to be dependent on the intensity of heating and on the levels of internal and ambient temperatures. The results indicate that thermal stimuli applied to the spinal cord do not only affect the mechanisms of shivering and of cutaneous blood flow, but also influence the supraspinal mechanisms of respiratory heat dissipation. Therefore, thermal stimuli to the spinal cord must be conducted to higher levels of the central nervous system. Author

**N73-27055#** Civil Aeromedical Inst., Oklahoma City, Okla.  
**TRANSIENT BLINDNESS DUE TO THE COMBINED EFFECTS OF MEVINPHOS AND ATROPINE**

Alvin M. Revzin Feb. 1973 5 p refs

(FAA-AM-73-4) Avail: NTIS HC \$3.00

Three squirrel monkeys did not respond to visual stimuli for at least one hour following combined administration of mevinphos (Phosdrin) and atropine. Therefore, aerial applicator personnel being treated for mevinphos (Phosdrin) poisoning with atropine may show potentially hazardous dysfunctions of visual perception. Some mechanisms for this effect were discussed. Author

**N73-27056#** Civil Aeromedical Inst., Oklahoma City, Okla.  
**SUBTLE CHANGES IN BRAIN FUNCTIONS PRODUCED BY SINGLE DOSES OF MEVINPHOS (PHOSDRIN)**

Alvin M. Revzin Feb. 1973 8 p refs

(FAA-AM-73-3) Avail: NTIS HC \$3.00

Mevinphos (Phosdrin) was found to inhibit the amplitude of hippocampal evoked potentials in unanesthetized squirrel monkeys with chronically in-dwelling electrodes. The threshold dose was 0.050 mg/kg and the maximal dose studied was 0.200 mg/kg. Doses above 0.200 mg/kg induced hippocampal seizures. Within the dose range of 0.050 mg/kg to 0.200 mg/kg the amplitude and duration of the inhibition were directly proportional to dose. No peripheral signs of poisoning, such as tremor or salivation, were seen at doses of 0.200 mg/kg or under. The discussion emphasizes that mevinphos produces changes in brain function in the absence of the peripheral symptomatology usually taken as indicators of poisoning by aerial applicator personnel. Therefore, it is concluded that exposure to mevinphos may be unexpectedly hazardous since that aerial applicators may be unaware that they have been poisoned. Author

**N73-27057\*#** National Aeronautics and Space Administration, Washington, D.C.

**INVESTIGATIVE METHODS IN SPACE BIOLOGY AND MEDICINE: TRANSMISSION OF MEDICAL DATA**

R. M. Bayevskiy and W. R. Adey Jul. 1973 60 p refs Transl. into ENGLISH from the publ. "Osnovy Kosmicheskoy Biologii i Meditsiny" Moscow, Nauka, 1973 p 1-86

(NASA-TT-F-14996) Avail: NTIS HC \$5.00 CSCL 06E

Physiological measurement systems and methods of clinico-physiological examination in space flight are discussed along with telemetry. Recommendations for improving physiological measurements in space are included. F.O.S.

**N73-27058\*#** Stanford Research Inst., Menlo Park, Calif.  
**AROUSAL FROM SLEEP BY NOISES FROM AIRCRAFT WITH AND WITHOUT ACOUSTICALLY TREATED NACELLES**

J. S. Lukas, D. J. Peeler, and M. E. Dobbs Washington NASA Jul. 1973 51 p refs

(Contract NAS1-11243)

(NASA-CR-2279) Avail: NTIS HC \$3.00 CSCL 06S

The electroencephalographic and behavioral responses during sleep of four subjects, aged 46 to 58 years, to three types of noises were tested over 14 consecutive nights. The stimuli were two DC-8 jet landing noises (each 30 seconds in duration and coming from DC-8 aircraft with and without acoustical treatment on the engine nacelles) and a 4-second burst of pink noise. Each of the noises was tested at nominal intensities of 61 and 79 dBA. Other physical descriptors of the noises were measured or computed. The results indicate that for an equivalent degree of sleep disruption, noise from the jet aircraft with untreated nacelles must be about 6 dBA less intense than the jet with acoustically treated nacelles. Predictions of the effects of noise on sleep appear, tentatively, to attain the highest accuracy when the physical descriptor of noise intensity includes information about the impulsive characteristics of that noise as well as its long-term spectral content. Author

**N73-27059\*#** Stanford Univ., Calif. Instrumentation Research Lab.

**CYTOCHEMICAL STUDIES OF PLANETARY MICRO-ORGANISMS - EXPLORATIONS IN EXOBIOLOGY Summary Report, 1 Jan. - 31 Dec. 1972**

Joshua Laderberg 31 Dec. 1972 44 p refs

(Grant NGR-05-020-004; Contract ARPA SD-183; Grants

GM-00612; RR-00311; GM-17367)

(NASA-CR-133272; IRL-1158) Avail: NTIS HC \$4.25 CSCL 06C

Analytical methodology using gas chromatography and mass spectrography for improved physiological monitoring of astronauts is developed. Reported research covers the following topics: (1) Chlorination of DNA bases; (2) mass fragmentography; (3) mass spectrometry; (4) urine analysis for metabolic constituents; (5) analysis of natural products by mass spectrometry; (6) computer identification of unknown molecular compounds; (7) fluorescent sorter for cell separation; (8) Mariner Mars 1971 orbital photography; and (9) Viking Lander imagery. G.G.

**N73-27060#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**PREFLIGHT HEAT STRESS AND RECOVERY**

Fritz K. Klemm, Abbott T. Kissen, and John F. Hall, Jr. Feb. 1973 14 p refs

(AF Proj. 7222)

(AD-759173; AMRL-TR-72-87) Avail: NTIS CSCL 06/19

Changes in physiological responses during heat stress as experienced in summer preflight operations have been studied with four sitting, resting subjects wearing Air Force standard fighter clothing assemblies. After exposure to chamber temperatures of 45, 50, and 55C (25 mm Hg water vapor pressure and 1.1 m/sec air velocity) for either 30 or 60 minute periods, the temperatures were lowered rapidly (5 minutes) to 15, 20, and 25C, respectively, for a 30-minute poststress recovery period.

Skin temperature, rectal temperatures, heart rates, body heat storages, sweat and evaporation rates were determined and graphically presented. The time required to return to prestress baseline physiological values for all thermal stress conditions is given in tabular form. As expected, recovery time was a function of the ambient recovery temperature level that followed the heat exposure. The recovery temperature should not be lower than 20C if discomfort is to be avoided. Heart rate decrease appears to be a reliable indicator for recovery. The rectal temperature remained at an elevated level after all other measured physiological responses returned to baseline level. In an additional series, applying identical heat stresses, the subject's head was ventilated with 2.5 CFM dry air at 10C. In comparison to the experiments without head ventilation, reduced skin temperatures and increased evaporation rates were observed. Author (GRA)

**N73-27061#** Michigan Coll. of Osteopathic Medicine, Pontiac.  
**THE EFFECTS OF OXYGEN AT HIGH PRESSURE ON CATECHOLAMINE METABOLISM** Final Report  
Rodney T. Houlihan 31 Dec. 1972 10 p refs  
(Contract N00014-70-A-0159-0001; NR Proj. 101-654)  
(AD-759405; Rept-301) Avail: NTIS CSCL 06/19

The involvement of epinephrine oxidation and indole production during acute oxygen poisoning was investigated. Cyclic oxidation of epinephrine has been verified. Adrenalectomy, which protects animals from oxygen toxicity, inhibits indole production. Enzyme activity is significantly increased during exposure to high pressure oxygen. There are species differences with respect to lung changes following seizures induced by hyperbaric oxygen. (Author Modified Abstract) GRA

**N73-27062\*** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**OPHTHALMIC METHOD AND APPARATUS** Patent

John C. Evvard, William J. McGannon, and Donald J. Vargo, inventors (to NASA) Issued 5 Jun. 1973 4 p Filed 15 Nov. 1971 Supersedes N73-23079 (11 - 14, p 1613)  
(NASA-Case-LEW-11669-1; US-Patent-3,736,938;  
US-Patent-Appl-SN-198885; US-Patent-Class-128-305;  
US-Patent-Class-128-2; US-Patent-Class-128-24A;  
US-Patent-Class-32-28; US-Patent-Class-32-58) Avail: US Patent Office CSCL 06L

A method and apparatus for removing material and components such as the lens from an eye is described. High speed rotary cutting members at one end of a rod macerate the lens while an annular tubing disposed around the cutting members vibrates ultrasonically to coact with the cutting members in macerating the lens. At the same time, a liquid is supplied to the chamber behind the cornea of the eye. Spiral grooves extending along the rotating rod from the cutting members evacuate the liquid and the macerated material from the eye. An alternate embodiment of the apparatus includes a tube through which liquid is supplied to the operative site of the ultrasonically vibrating tube and the cutting members in the area of the lens.

Official Gazette of the U.S. Patent Office

**N73-27063** Stanford Univ., Calif.  
**INVESTIGATION OF AN ASTRONAUT MANEUVERING SCHEME** Ph.D. Thesis

Michael Ray Headrick 1972 105 p  
Avail: Univ. Microfilms Order No. 73-4512

A series of experiments which establish the feasibility of limb controlled maneuvering is described. These experiments use a weightlessness simulator which, in broad outline, operates as follows. The torso of the test subject is strapped to a gimbaled head which is mounted upon a moving carriage such that the torso has six degrees of freedom. The subject is free to move his arms, and certain angles which describe the position of the arms relative to the torso are monitored electrically. The subject is also free to turn thrusters on or off, and this activity is monitored electrically. The electrical signal from the arm angle sensors and the thrust control are transmitted to a hybrid analog-digital

computer, which integrates equations of motion to determine the behavior the torso would have in free space and causes servomotors to drive the torso correspondingly. The resulting torso motion reflects the human capability to use the maneuvering concept since this motion is generated from the test subject's response to his perception of his state of motion.

Dissert. Abstr.

**N73-27064#** Joint Publications Research Service, Arlington, Va.

**MAN AND HIS ENVIRONMENT**

27 Jun. 1973 47 p Transl. into ENGLISH from Vopr. Filosofii (Moscow), nos. 1 and 2, 1973 p 48-60, 36-52  
(JPRS-59369) Avail: NTIS HC \$4.50

Materials from a roundtable meeting of scholars devoted to consideration of the interrelationship between man and his environment are presented. Author

**N73-27065#** Joint Publications Research Service, Arlington, Va.

**INTERACTION BETWEEN MAN AND BIOSPHERE**

M. I. Budyko 26 Jun. 1973 16 p refs Transl. into ENGLISH from Vopr. Filosofii (Moscow), no. 1, 1973 p 61-70  
(JPRS-59366) Avail: NTIS HC \$3.00

The changes in the balanced nature of the biosphere as a result of the coming of man are described. Author

**N73-27066#** Civil Aeromedical Inst., Oklahoma City, Okla.  
**JOB ATTITUDES OF AIR TRAFFIC CONTROLLERS: A COMPARISON OF THREE AIR TRAFFIC CONTROL SPECIALTIES**

Roger C. Smith Jan. 1973 34 p refs  
(FAA-AM-73-2) Avail: NTIS HC \$3.75

A total of 792 journeyman air traffic controllers answered a four-part questionnaire concerning: (1) what they liked and disliked about ATC work; (2) how much they liked or disliked certain specific aspects of ATC work; (3) how they felt about shift work, and (4) their level of job satisfaction. They liked most of their job tasks and the challenge of ATC work; they tended to dislike management, their work schedules, and job tasks not directly related to traffic control or flight service. Concerning shift work, it was found that the most negative attitudes were associated with night shifts. Controllers also indicated a preference for rapid turn-around shift rotation schedules. Finally, these satisfaction questionnaires indicated that approximately 91% of the controllers surveyed were satisfied with their occupational choice. Author

**N73-27067\*#** Scientific Translation Service, Santa Barbara, Calif.

**BIOLOGICAL LIFE SUPPORT SYSTEMS**

Ye. Ya. Shepelev Washington NASA Jul. 1973 113 p refs  
Transl. into ENGLISH from Osnovy Kosmich. Biol. i Med. (Moscow), v. 3, pt. 3, ch. 3, 1973 p 1-115  
(Contract NASw-2483)

(NASA-TT-F-15005) Avail: NTIS HC \$7.75 CSCL 05E

The development of a human living environment by biological methods utilizing the appropriate functions of atrophic and heterotrophic organisms is discussed. Certain properties of natural biological systems and a simulated biological life support system are discussed. The problems and prospects for the development of individual functional links in biological life support systems are presented. Author

**N73-27068\*#** National Aeronautics and Space Administration, Washington, D.C.

**SAFETY OF LIFE AND HEALTH OF CREWS OF SPACECRAFT AND SPACE STATIONS IN EMERGENCY SITUATIONS**

I. N. Chernyakov Jul. 1973 38 p refs Transl. into ENGLISH from the publ. "Osnovy Kosmicheskoy Biologii i Meditsiny"

Moscow, Acad. of Sci., 1973 p 1-64

(NASA-TT-F-14997) Avail: NTIS HC \$4.00 CSCL 05E

The research is reported on the problems of life support for cosmonauts in emergency situations, during flight, for depressurization, fire, and the failure of air regeneration systems. Attention is focused on the effectiveness of on-board rescue resources. F.O.S.

**N73-27069\*** Michigan Univ., Ann Arbor.

**THE USE OF A TRACKING TEST BATTERY IN THE QUANTITATIVE EVALUATION OF NEUROLOGICAL FUNCTION**

Brian S. Repa [1973] 147 p refs

(Contract NSR-23-005-364)

(NASA-CR-132275) Avail: NTIS HC \$9.50 CSCL 05E

A number of tracking tasks that have proven useful to control engineers and psychologists measuring skilled performance have been evaluated for clinical use. Normal subjects as well as patients with previous diagnoses of Parkinson's disease, multiple sclerosis, and cerebral palsy were used in the evaluation. The tests that were studied included step tracking, random tracking, and critical tracking. The results of the present experiments encourage the continued use of tracking tasks as assessment procedures in a clinical environment. They have proven to be reliable, valid, and sensitive measures of neurological function. Author

**N73-27070\*** Joint Publications Research Service, Arlington, Va.

**DEVELOPMENT OF MAN-COMPUTER INTERACTION**

G. L. Smolyan 29 May 1973 21 p refs Transl. into ENGLISH from Vopr. Filosofii (Moscow), no. 3, 1973 p 30-43 (JPRS-59149) Avail: NTIS HC \$3.25

The problem of interaction between man and computers, as a primary factor in raising the efficiency of man-machine systems of control and data processing is examined. Author

**N73-27071\*** AiResearch Mfg. Co., Torrance, Calif.  
**STUDY AND DEVELOPMENT OF A CRYOGENIC HEAT EXCHANGER FOR LIFE SUPPORT SYSTEMS** Final Report  
M. M. Soliman 23 Mar. 1973 167 p refs  
(Contract NAS8-28099)  
(NASA-CR-124301; Rept-73-9117) Avail: NTIS HC \$10.50 CSCL 06K

A prototype cryogenic heat exchanger for removal of waste heat from a spacecraft environmental control life support system was developed. The heat exchanger uses the heat sink capabilities of the cryogenic propellants and, hence, can operate over all mission phases from prelaunch to orbit, to post landing, with quiescent periods during orbit. A survey of candidate warm fluids resulted in the selection of E-2, a fluorocarbon compound, because of its low freezing point and high boiling point. The final design and testing of the heat exchanger was carried out, however, using Freon-21, which is similar to E-2 except for its low boiling point. This change was motivated by the desire for cost effectiveness of the experimental program. The transient performance of the heat exchanger was demonstrated by an analog simulation of the heat sink system. Under the realistic transient heat load conditions (20 sec ramp from minimum to maximum Freon-21 inlet temperature), the control system was able to maintain the warm fluid outlet temperature within + or - 3 F. For a 20-sec ramp from 0 F to -400 F in the hydrogen inlet temperature, at maximum heat load, the warm fluid outlet temperature was maintained within + or - 7 F. Author

**N73-27072\*** McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Biotechnology and Power Dept.

**COST ANALYSIS OF LIFE SUPPORT SYSTEMS** Final Report

M. M. Yakut Jun. 1973 58 p refs

(Contract NAS8-28377)

(NASA-CR-124305; MDC-G4630) Avail: NTIS HC \$5.00 CSCL 06K

A methodology was developed to predict realistic relative cost of Life Support Systems (LSS) and to define areas of major cost impacts in the development cycle. Emphasis was given to tailoring the cost data for usage by program planners and designers. The equipment classifications used based on the degree of refinement were as follows: (1) Working model; (2) low-fidelity prototype; (3) high-fidelity prototype; and (4) flight-qualified system. The major advanced LSS evaluated included the following: (1) Carbon dioxide removal; (2) oxygen recovery systems; (3) water recovery systems; (4) atmosphere analysis system.

Author

**N73-27073\*** McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Biotechnology and Power Dept.

**COST ANALYSIS OF CARBON DIOXIDE CONCENTRATORS** Final Report

M. M. Yakut Jun. 1973 54 p refs

(Contract NAS8-28377)

(NASA-CR-124302; MDC-G4631) Avail: NTIS HC \$4.75 CSCL 06K

Methodology and cost estimating relationships, for flight-type and prototype CO2 concentrators, have been developed and presented. A validity check was made by comparing the molecular sieves system considered here and that developed for Skylab. The system evaluated here is twice the size of the Skylab system and is also more complex as it desorbs CO2 thermally and stores it in an accumulator. The cost estimates developed were found to be approximately 50 to 70% higher than the actual cost of the Skylab unit. Author

**N73-27074\*** McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Biotechnology and Power Dept.

**COST ANALYSIS OF WATER RECOVERY SYSTEMS**

M. M. Yakut Jun. 1973 87 p refs

(Contract NAS8-28377)

(NASA-CR-124303; MDC-G4632) Avail: NTIS HC \$6.50 CSCL 06K

A methodology was developed to predict the relevant contributions of the more intangible cost elements encountered in the development of flight-qualified hardware based on an extrapolation of past hardware development experience. Major items of costs within water recovery systems were identified and related to physical and/or performance criteria. Cost and performance data from Gemini, Skylab, and other aerospace and biotechnology programs were analyzed to identify major cost elements required to establish cost estimating relationships for advanced water recovery systems. The results of the study are expected to assist NASA in long-range planning and allocation of resources in a cost effective manner in support of earth orbital programs. This report deals with the cost analysis of the five leading water reclamation systems, namely: (1) RITE waste management-water system, (2) reverse osmosis system, (3) multifiltration system, (4) vapor compression system, and (5) closed air evaporation system with electrolytic pretreatment.

Author

**N73-27075\*** McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Biotechnology and Power Dept.

**COST ANALYSIS OF OXYGEN RECOVERY SYSTEMS**

M. M. Yakut Jun. 1973 57 p refs

(Contract NAS8-28377)

(NASA-CR-124304; MDC-G4633) Avail: NTIS HC \$5.00 CSCL 06K

The design and development of equipment for flight use in earth-orbital programs, when optimally approached cost effectively, proceed through the following logical progression: (1) bench testing of breadboard designs, (2) the fabrication and evaluation of prototype equipment, (3) redesign to meet flight-imposed requirements, and (4) qualification and testing of a flight-ready system. Each of these steps is intended to produce the basic design information necessary to progress to the next step. The cost of each step is normally substantially less than that of the following step. An evaluation of the cost elements involved in each of the steps and their impact on total program cost are



presented. Cost analyses of four leading oxygen recovery subsystems which include two carbon dioxide reduction subsystem, Sabatier and Bosch, and two water electrolysis subsystems, the solid polymer electrolyte and the circulating KOH electrolyte are described. Author

**N73-27076\*** McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Biotechnology and Power Dept.  
**COST ANALYSIS OF ATMOSPHERE MONITORING SYSTEMS** Final Report  
 M. M. Yakut Jun. 1973 45 p refs  
 (Contract NASB-28377)  
 (NASA-CR-124306; MDC-G4634) Avail: NTIS HC\$4.25 CSCL 08K

A methodology was developed to predict realistic relative cost of life support systems and to define areas of major cost impacts in the development cycle. Emphasis was given to tailoring the cost data for usage by program planners and designers. Cost estimates can be completed using the developed equations for varying degrees of equipment refinement, as well as comparative costs between different functional methods. Cost analysis of two leading atmosphere monitoring systems, namely the mass spectrometer and the gas chromatograph, is discussed. A summary of the approach used in developing the cost estimating techniques is presented. Included are the cost estimating techniques, the development of cost estimating relationships, and the atmosphere monitoring system cost estimates. Author

**N73-27077\*** Society of Automotive Engineers, Inc., New York. Bioenvironmental Systems Study Group.  
**REVIEW AND EVALUATION OF UNIVERSITY GRANT APPLICATIONS FOR LIFE SUPPORT AND CREW EQUIPMENT RESEARCH IN FISCAL YEAR 1974**  
 May 1973 24 p  
 (Contract NASw-2430)  
 (NASA-CR-133421) Avail: NTIS HC \$3.25 CSCL 06K

Results of a review and technical evaluation of seven research grant applications, related to the field of life support systems and crew equipment technology are presented. The proposals are ranked according to: (1) The technical quality (and promise for effective accomplishment) of the rationale and work plan; and (2) the applicability and priority of importance in terms of NASA's technical interests and requirements in the life support/crew equipment area. Author

**N73-27078\*** BioTechnology, Inc., Falls Church, Va.  
**PROTECTION AGAINST HEARING LOSS IN GENERAL AVIATION OPERATIONS, PHASE 2** Final Report  
 James F. Parker, Jr. Sep. 1972 26 p refs  
 (Contract NASw-2265)  
 (NASA-CR-133303) Avail: NTIS HC \$3.50 CSCL 05E

An inflight evaluation of four aural protectors is presented. The hearing protection devices studied were ear muffs, plastic ear plugs, rubber ear plugs, and wax ear plugs. It is concluded that ear plugs are satisfactory for providing adequate sound attenuation in general aviation aircraft. However, two problems were found in the use of ear plugs: comfort and interference with cabin communications. F.O.S.

**N73-27079\*** Naval Aerospace Medical Research Lab., Pensacola, Fla.  
**THE USE OF CONFIDENTIAL INSTRUCTOR RATINGS FOR THE PREDICTION OF SUCCESS IN NAVAL UNDERGRADUATE PILOT TRAINING**  
 Wayne L. Waag, Richard H. Shannon, and Rosalie K. Ambler 7 Feb. 1973 19 p refs  
 (AD-757693; NAMRL-1175) Avail: NTIS HC \$3.00 CSCL 05/9

Previous investigations have reported significant relationships between confidential instructor ratings in early primary phase and later success in Naval flight training. Such ratings were

found to increase significantly the validities derived solely from selection test scores. However, such findings do not guarantee that confidential ratings would augment the validities derived from the combined array of selection and early training variables which are used in the current student pilot prediction system. The purpose of the present study was to determine whether such confidential ratings provided nonredundant information which would increase the predictive value of the present system. The results clearly indicated that confidential ratings obtained from Primary flight instructors provided information relating to the student's probability of receiving his wings. Such ratings were found to significantly increase the predictive validities derived from the variables which are used currently in the student pilot prediction system. Such findings suggest that these confidential evaluations provide additional information beyond that which is reflected in the grades he assigns. It is recommended that confidential instructor ratings be implemented on a permanent basis in the presolo stage. The present student pilot prediction system should be revised to incorporate this information. Author (GRA)

**N73-27080\*** Logicon, Inc., San Diego, Calif.  
**AUTOMATED FLIGHT TRAINING (AFT). INSTRUMENT FLIGHT MANEUVERS** Final Report  
 John P. Charles, Robert M. Johnson, and Jay R. Swink Feb. 1973 94 p refs  
 (Contract N61339-71-C-0205; NAVTRAEQUIPCEN Proj. 2753-01)  
 (AD-759366; SDR-113(AFT-I)FR;  
 NAVTRAEQUIPCEN-71-C-0205-1) Avail: NTIS CSCL 05/9

An investigation of the feasibility of applying automated adaptive training methods and techniques to operational flight trainers for basic flight training was conducted. The study explored the on-line restructuring of a computer controlled training course for basic instrument flight maneuvers. Performance evaluation techniques were developed to permit evaluation of student performances in real time. The study uses an R and D simulator and trainees of varied flight experience. A computer controlled voice system was employed for verbal briefings, instructions, and feedback. The results indicated that these techniques can be effectively applied to both initial skill acquisition and proficiency training. The system can identify student skill deficiencies and adapt the training course to meet his training needs. Author (GRA)

**N73-27081\*** Lear Siegler, Inc., Los Angeles, Calif. Systems Technology Center.  
**STUDY OF CAPABILITIES, NECESSARY CHARACTERISTICS AND EFFECTIVENESS OF PILOT GROUND TRAINERS. VOLUME 1: MAIN TEXT** Final Report, Jul. 1970 - Jun. 1971  
 Peter Stanek Jan. 1973 260 p refs  
 (Contract DOT-FA70NA-506)  
 (AD-755681; STC-16001-Vol-1; FAA-RD-72-127-Vol-1) Avail: NTIS CSCL 05/9

An experiment was conducted to test the capabilities, necessary characteristics, and effectiveness of Pilot Ground Trainers in developing primary aeronautical skills, those maneuvers and procedures defined in Federal Air Regulations 61.37, 61.87, 61.117 and appropriate Flight Test Guides, limited to aircraft, single-engine, land. During the first phase of the experiment, 30 subjects were trained to proficiency under part 61.87, fifteen in aircraft only and fifteen in combined ground trainer and aircraft. During the next phase, 20 of the original 30 were trained to proficiency under 61.37 and 61.117, 10 in each group. A third phase of the experiment tested additional subjects in various procedures with varying levels of simulator capability. The results of the experiment show which maneuvers and procedures may be taught effectively and efficiently in a ground trainer. Author (GRA)

**N73-27082\*** California Univ., Santa Barbara. Inst. of Environmental Stress.  
**PHYSIOLOGICAL PERFORMANCE RELATED TO MULTIPLE**

**STRESSES SUCH AS THOSE EXPERIENCED IN THE AIR  
FORCE OPERATIONS Final Report**

Steven M. Horvath Apr. 1973 7 p refs  
(Grant AF-AFOSR-1653-69; AF Proj. 9777)  
(AD-759565) Avail: NTIS CSCL 06/19

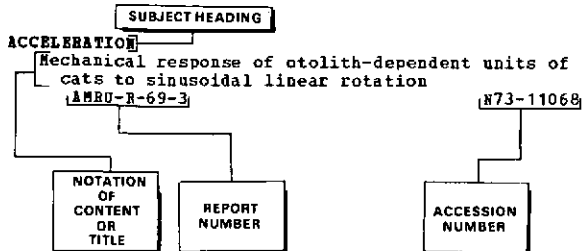
The basic studies have been concerned with altitude stress, ambient environmental stress, endocrine interrelationships, exercise stress, and the physiological alterations and adjustments to hemorrhagic shock. To determine more adequately psychological and physiological responses new techniques were developed. The most exciting developments involved the determination of catecholamines in nanogram quantities and the measurement of cortisol by a radioimmunological procedure. Much of the value of this research will be forthcoming in studies presently underway where we will have gained additional insight into problems facing men flying with so-called low levels of hypoxic stress. However, adaptive phenomena occur even at these levels and the utilization of this beneficial adjustment to problems of flyers will be of importance.

Author (GRA)

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International Congress of Aeronautical and Space Medicine, 20th, Nice, France, September 18-21, 1972, Reports A73-36901

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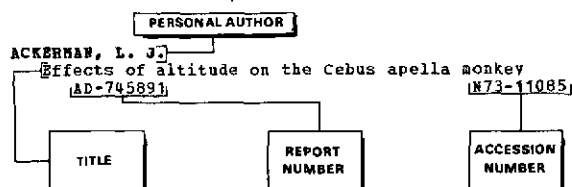
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